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Waste, Storage, and Supply of Water.

JULY, which is ordinarily one of the wettest months in the year, has been characterised, in the present season, by a long series of fine days, chequered by one or two local thunderstorms, of unusual fury. The failure of the ordinary summer supply of the springs and wells of the country is becoming apparent. Wells are sinking below their lowest recorded depths. Springs have disappeared. Brooks are changed into dry ditches. On the water-crane of the Great Western Railway, at Reading, might be read a significant notice,—"Water very short. Engine-drivers not to take more than necessary, in order to reach next station." "Water very short" may be taken as a general indication of the state of the country.

It is not surprising that, under such circumstances, the press should give expression to voices of alarm, of foreboding, or of counsel. "The Storage of Water" is a heading which may be expected to become more and more frequent. It may seem, at first, as if the rainfall was one of those matters which are, on the one hand, so vast in proportion, and on the other hand so capricious in distribution, that man can only look on in helpless expectancy, being altogether at the mercy of the elements. This view is, however, the very reverse of the truth.

The rainfall of the British Islands is usually spoken of as a definite average annual quantity. In point of fact, however, it varies not only from year to year, but from spot to spot, in an extraordinary degree. Thus in the year 1872 a fall of no less than 20 ft. of water (243·98 in.), was actually measured in the rain-gauge at the Stye Head Pass, in the district of the Westmoreland and Cumberland lakes. This fall, which is of tropical magnitude, is, indeed, so far as returns go, unique in Great Britain. But, in the same year, 133 in. of rain fell at Little Longdale, in the same district; 105·92 in. at Dartmoor Prison; 103·94 in. at Coniston; 150·21 in. at Beddgelert; and 143 in. at the Bridge of Orchy, in Scotland. During the same year the rainfall in the South Midland and South-Eastern counties of England ranged from 26 in. to 28 in.; being only the ninth part of the maximum fall above cited. The general rainfall of 1872, as far as it was actually gauged, was 36 per cent. above the usual average for the United Kingdom. In 1870, on the contrary, the fall was 18 per cent. below the average; making a difference of 54 per cent. between the water-supply of the two years in question. Even this great range does not express the variation in its highest terms. Over the district stretching from Ludlow to Oswestry, the excess of the fall of rain in 1872 over the average varied from 61 to 86 per cent. taking the returns of four different stations. On the other hand, we find that, in unusually dry years, the rainfall over portions of the watershed of the Thames valley has not exceeded 16 in.

Such, then, may be said to be the limits of the supply. The function of the engineer is to be prepared, on the one hand, to conduct to the sea, without damage to life or property, a mass of rain, which, if collected and unevaporated, would cover the wettest districts of England to a depth of from 10 ft. to 12 ft.; and, on the other hand, to economise an annual supply, which is only equal to four-fifths of the quantity which evaporates from the surface of a sheet of water within the twelve months.

A certain portion of this rainfall is actually converted into growing vegetable matter by the process of vegetation. But that quantity, which is ascertainable by chemistry, is but small in proportion to the total requirements of vegetation. We may tell how much water is bound up in the formed tissues of the plant; but we cannot tell how much has been absorbed by the roots, and again given forth by vegetable respiration, nor is this quantity one that is easy to ascertain. The growth of many plants depends as much, if not more, on the water contained as vapour in the air, as it does on that which is actually supplied to the roots. This is remarkably the case with the ferns. No amount of watering will enable the horticulturist to grow certain species of ferns in a dry air. On the other hand, in caves and grottoes where the direct supply of water to the roots is questionable, but where a damp air is prevalent, these lovely plants form a dense veil of green, and luxuriate with their tiny fronds.

We can tell, however, the effect of supplying water by artifice, when it is withheld by nature, to certain plants. Among these, the grasses are pre-eminent. The grasses do not require too much water, but they will greedily consume much. They will grow in a damp spot; but they will not grow, except at a great disadvantage, in a water-logged soil. On the loftiest hills of Cumberland and Westmoreland, fed by mountain rivulets, a fine grass grows, to no very great size, but so as to afford a most admirable food for the wandering sheep. In the water-logged valley of the Kennet, and in the damp clay soils of Pembrokeshire, sedges, reeds, and rushes, the *Typhaceæ*, the *Cyperaceæ*, and the *Pincaceæ*, take the place of the true grasses; and the grass which grows amid such neighbours is harsh, rank, and undesirable.

But when water is so distributed, either by nature or by art, as to afford all that the grass plant can absorb during the time of forming its flower and seed, without allowing the roots to be permanently submerged, we obtain the highest possible amount of produce. Forty pounds per acre is quoted as the produce of irrigated farms. And in the case of sewage irrigation the question is yet unsolved how much of the benefit is due to the water alone.

It is thus evident that a rainfall of at least 20 in., being an amount equal to the average annual evaporation (from a wet surface), as far as our observations go, in this country, is necessary to supply our grasses, in a state of nature, or of unirrigated cultivation. They should be fed with at least as much water as they can respire, which we may roughly take as equal to that which the atmosphere would lift from a wet soil. This would be actually the case in the favourable condition of plants growing in mould of some 8 in. to 16 in. in depth, with an impermeable subsoil. Alter these conditions, and the demand for water will vary. If the surface soil be impervious, the rain will either lie in puddles on the surface, till evaporated by sun and wind; or will hasten down a sloping surface to the outfall, and escape to the sea, in the form of a wasted and unproductive torrent. When, on the other hand, the subsoil is pervious, the rain sinks through the strata until arrested by some impervious floor. The plants in that case absorb only while the water is passing by their rootlets; that is to say, for a time not much longer than that occupied by the showers. And thus the earth is thirsty, and the crop parched. Enough rain for all the purposes of vegetation may have fallen, in each of the above-mentioned cases. But in neither of them have the plants derived the proper advantage. In the first case, the water was too hurriedly removed from the surface of the soil. In the latter, it too rapidly filtered through it. And as one or other of these conditions exist in the majority of cultivated soil, it becomes evident how much more rain is required by the farmer, than is actually used by the plant. Rain comes, with very rare exceptions, abundantly enough, if it were utilised, but not abundantly enough to be wasted.

Another, and by no means an unimportant, demand on the rainfall, is that of the animal world. As to this, we confine our calculations, in the first instance, to the human population. For this we must allow, not the mere supply for drinking, which is but a small amount, but enough for washing, cooking, and all the details of domestic procedure; for manufactures; and for the sanitary service of cities and towns. From 30 to 33 gallons per head *per diem* is the allowance now usually made in calculations of this kind. This allowance may be represented, with sufficient accuracy, by the allowance of 50 tons of water per head *per annum* to the population.

An inch of rainfall, on an acre of ground gives a quantity of 100 tons of water. Half an inch on an acre would, therefore, be the quantity necessary for the supply of each head of population for a year. The ratio between area and population in England is 1·51 acre per head of population; say an acre and a half per soul. A water supply of one-third of an inch over the surface of the country is therefore (evaporation and waste not being taken into account) all that is requisite for the wants of the human population, if it were all supplied according to urban requisites.

Mr. Symons's calculation of the average rainfall in England, from 1850 to 1859, is 33·04 in.; from 1860 to 1865 it is 34·97 in. The lowest supply noted is 18 per cent. below the average. Thus, 27·6 in. may be taken, approximately, as our minimum rainfall. Out of this we want ·33 in. for drinking, washing, and all domestic and urban purposes. There remains 27·27 in. What becomes of it?

We may glance, for a moment, at another way of stating the problem. Taking the dryest year, as before calculated, and taking a supply of the fixed quantity of 50 tons per head, the rainfall on an area of 90 square yards will suffice for an individual's consumption. (We are, of course, speaking of paper calculations, without reference to loss by evaporation.) On the roof of every building that covers an area of 27 ft. by 30 ft., falls, in the course of an exceptionally dry year, water enough for the consumption of an individual. Again, on the area of London, taken in round numbers at 78,000 acres, there fell, in the year 1872, 264 millions of tons of water; or a supply equal to the total consumption of the metropolis for between fourteen and fifteen months. And yet we are in want of water!

We thus come to the fact, that the adequacy of the rainfall in England, in the dryest years of which we have any experience, to supply the wants of man and beast, including, on the one hand, all the demands of urban life, and, on the other hand, all the requirements of vegetation, is not matter of chance, caprice, or doubt. Two or three times all that is necessary, if due care were taken of the precious supply, falls in the very dryest year. Of the dealing with this supply by works intended for irrigation, we have more than once spoken. We are now referring, not to large works, but to the appli-

cation of labour which is, more or less, at the command, not only of every farmer, but of every cottage gardener.

We see that on dry soils, such as are to be found at Warrington, at Hendon, in the valley of the Brent, and in numerous spots which will readily recur to our readers, the rain is wasted, in consequence of the impermeable nature of the soil. We are speaking of neglected spots. The water lies on the surface till it evaporates, or runs off, when slope suffices, in torrents; hardly any of it is absorbed by the plants. Rushes grow in the puddles, and the soil is alternately a swamp and a dry, baked, barren waste.

On the sands of Hampshire and Surrey, on the other hand, drought and barrenness arise from the very opposite reason. There the water runs too rapidly through the porous soil. It does not remain long enough within the reach of the roots of the plants to be utilised. It hastens on its subterranean journey to the sea.

The same is the case, to a great extent, with the chalk districts. On the high downs the water sinks through the chalk almost as rapidly as it does through sand. Thus, in the present summer, large districts of the Wiltshire chalk downs have been absolutely parched by the sun. In chalk valleys, on the other hand, where the water is retained by the outcrop or uptilting of impervious strata below the chalk, the latter substance is saturated, and all the evils of a waterlogged soil accrue.

Thus we can understand the rare fertility of the marls and loams which form the soil of the most fertile districts of England. By a judicious mixture of clays, sands, and limes, that mechanical condition of the soil may be attained which best applies the rainfall to the roots. In such a soil the water percolates slowly. The roots have time to drink. They are neither drowned nor starved. It is to the mechanical nature of the soil, its judicious adaptation to serve the purpose of a very slow filter, rather than to its chemical constitution, that extraordinary fertility is to be ascribed.

We think it almost certain that too much attention has been of late directed to the chemical, rather than to the mechanical, elements of soil. We know that the great bulk of vegetation is formed of matters which do not impoverish the soil, which supplies them rather as a channel, than as a source. Water, carbonic acid, and ammonia, are the constituents of *protoplasm*, or the raw material of organic matter. The small amounts of phosphates and silicates which are required in addition are usually to be found in adequate quantities. Yet it is in the supplies of phosphates—to an amount entirely out of proportion to the demand of vegetation—that the chief expense, in the direct effort to fertilise the soil, is now generally incurred by the farmer. We believe that, in most cases, it would be more remunerative to expend a given sum in labour than in manure.

Thus with regard to the great change which has recently been effected, by some farmers, in the rotation of crops, and which we have seen spoken of as "perpetual corn farming," some very important pieces of information have been incidentally brought to light. At Blount's Farm, near Sawbridgeworth, in Hertfordshire, Mr. John Prout has just had his eleventh annual sale of white corn from the same fields. The soil of these fields has been carefully analysed. The result is, the presence of enough of phosphoric acid to grow from 172 to 433 crops of wheat, grain, and straw; of enough sulphuric acid to grow from 50 to 500 crops; and of other minerals in larger quantities. Why then, on such a soil, does the farmer find it answer to apply guano or bone-dust? Because in so doing, he so levigates and tempers the soil, as to bring the rain more readily within the reach of the roots, and to retain it for a longer time, without absolute stagnation.

The same reason explains the free use of lime, in North and South Wales, on the slate and clay soils; where in many districts it is the only manure employed. About Rhaiader, for example, it is fetched for such long distances, and over such bad roads, that it was calculated some years ago that the farmers would have been gainers by making a railway at their own expense, if they had derived no further profit from the shares than the reduction of the price of lime in consequence of railway carriage.

This, again, explains the extraordinary fertility which, in some districts of Lancashire, has been attained by the dressing of the soil with the sand of the great estuary, known as Lancaster Sands. The *detritus* brought down by the Kent, the Daddon, and other rivers, may be rich in *humus*. But the levigation of the clay soil, by the admixture of sand, serves even more directly the mechanical requisites of the case than does the admixture of lime.

So, again, on poor chalk land, we sometimes see a dressing of burnt clay applied with good results. If our views are correct, the burning of the clay is an unnecessary expense,—all that is necessary is its comminution. Clay spread in small portions over chalk produces a mixture similar to that obtained by dressing clay soils with lime. Where the three ingredients—clay, sand, and lime—are all present, the most mechanically perfect, and also the most fertile soil, is formed.

Thus, in the application of lime, or of sand to clay soils; of clays to chalk; and of sea sand to either argillaceous or calcareous soils; we are acting on the same principle. In neither case is it the addition of fresh mineral ingredients which causes the increased fertility. The mineral elements required by the cereals and other crops are, for the most part, existent in ample quantities in almost every description of soil. It is the mechanical nature of the soil, or its adaptation to the purpose of a slow, but efficient, filter, that is the secret of success. And as, on the one hand, without care directed to this end, the rainfall is in a great measure wasted; so, on the other hand, with wise treatment of the soil the rainfall of England is ample for the need of the farmer, as well as for that of the sanitary reformer.

Again, it will be evident to our readers that the very same process which is necessary to the purification of water which has been once polluted by dangerous matter, is that on which the fertility of the country depends as regards the rainfall. Strain, filter, deodorise, burn,—do what we will with the grosser impurities carried from our cities, one essential requisite remains. Effluent water must percolate through the soil. This is a prime sanitary canon. It is one of those rules which have no exceptions—none, that is to say, if health and safety be regarded. Now, just as a careful study of the subject tends to the conclusion that that filtration must be continuous and active; that there must be no soaking, no soddening of the roots, no deposit of stagnant puddles, without great risk to health; so do we find that vegetable health requires the same thing. If stagnant water be bad for man, it is no less bad for crops. The more we provide for health, the more do we produce fertility. It is not a question of one advantage being set against another. It is not that we are called on to keep down the doctor's bill by an expenditure of labour which has no other result. We have the very opposite case to that of burning a candle at both ends. We have the filling a reservoir from two channels. As we study health, we study wealth; as we feed on plants, we shall feed and guard ourselves.

We are desirous that this view of the wisest mode of expending a given sum on land should be seriously regarded by our agricultural readers. In any case we believe that their experience will fully coincide with our views. What is the great effect of deep ploughing, of spade culture, of under drainage? In every instance it is the same. It is the converting of the soil into an efficient, but slow, filter. It is the production of a condition which will allow the soil, impervious when unbroken, to become pervious. It is to throw mechanical obstacles in the way of the too rapid filtration through highly-porous soil, by mixing it with a more retentive material. We are not undervaluing manures. On that important question we are offering but one suggestion. The constituents of all crops are known. The constituents of every soil may be chemically ascertained. A comparison of the two will tell any one what character and what amount of manure is required by any given soil for any required crop. We think that this simple sum will show a great amount of over-manuring, chemically regarded. But this is a question for each cultivator to settle for himself. One thing we hope we have made evident, and that is, that the incidental effect of manuring soil, which is produced by the levigation, pulverisation, and mechanical admixture of its elements, is of so great importance that it is highly probable that it may often have a more direct effect in stimulating vegetation than the chemical elements added in the process. Water alone supports much vegetable life. Water administered to the plant in the soil is the first requisite for fertility. Labour applied to the tempering of the soil will allow an inch of rainfall to exert greater fertilising power than that of 10 in. of rain on neglected soil. The first demand, then, for the storage of water, is to be met by the plough, the spade, and the drain-tile. Labour, wisely applied, has an effect which is equivalent to the production of rainfall, almost at will.

BRICK AND MARBLE IN THE MIDDLE AGES.

In following out the points for contrast or comparison between Northern and Italian Gothic,* there can be no doubt that the most striking of all is in the treatment of the tower, that necessary adjunct of a church in the days of campanology. Readers will remember the point made of this in the vignette to Mr. Ruskin's early work, "The Stones of Venice," where the Italian campanile and the English tower are contrasted in a manner which indicates the advocate rather than the impartial critic. That the Italian campanile in its typical form has a grand simplicity and unity of expression, and that it produces a great effect in proportion to its size and simplicity of ornamentation, can hardly be questioned; and some modern Gothic practitioners have endeavoured to adapt the Italian method of treatment to towers with essentially Gothic detail. New effects may be procurable by this means, but a criticism which should give the palm to the Italian tower above the best of our own would be one founded on the desire for novelty rather than on a true judgment of their merits. The fault, however, of a considerable proportion of English towers certainly is in their want of a predominating *motif* in the design, and picturesqueness is sometimes obtained at the expense of grandeur and apparent height. We do not, think, however, that the present fashion of straight vertical towers with top-heavy upper stages, in such buildings as town-halls, &c., will be regarded with admiration by our successors. The impression conveyed by a study of these in conjunction with old Gothic examples would be, that the architects of the present generation had wilfully introduced a clumsy and inelegant form of tower from abroad, instead of working out to new results the far more truly architectural forms of their own country. Of this latter and wiser process the Victoria Tower remains an admirable and rare monument, and one superior in dignity of effect to any Italian campanile.

The extensive employment of brick in the Gothic buildings of Italy is another peculiarity which has had its influence on recent English practice, in leading to more extensive attempts at brick ornamentation than were at all usual in this country until lately. This, if carried out with judgment, is a move in the right direction; for economical considerations will always compel the use of brick to a great extent, and without questioning the superiority of stone for all the best purposes of the architect, a building which has to be for the most part in brick will often be more effective when finished entirely in that material than with the orthodox complement of "stone dressings." In studying the brick architecture of Italy, for hints to this end, it must not, however, be forgotten that in that country brick was used largely in imitating details which had in their original form been elaborated in stone, and thence borrowed by the brick builders of Italy. No one would think of maintaining that cusping could have been invented as a feature for brick architecture; and the mode of treating it in brick (specially illustrated in Mr. Street's volume) by setting the bricks as radiating voussoirs, and cutting and shaping their ends to the required curve, is essentially unarchitectural, and by no means to be imitated. It is simply an ingenious way of producing in brickwork forms which belong properly to ornamental masonry. There is plenty of scope for novelty and picturesque design in brick without going beyond the forms and sources of decoration to which this material naturally lends itself.

Of the places of architectural interest included in a town in North Italy, such as that chronicled in the work which gives occasion for these remarks, none are of more enduring interest than Verona and Venice, an interest comparative as well as positive. If a salient instance were required of the effect of geographical position and commercial relations upon architecture, one could not point to any more striking than is displayed by these two towns, not much more

* See p. 642, *ante*.

than forty miles apart in precisely the same degree of latitude, in the one of which the architecture is essentially Northern, Gothic, in feeling (so far as Italy ever attained this feeling), while in the other, despite Gothic forms of detail, the whole feeling and treatment of the architecture breathes of Oriental fancy and sumptuousness. Architecture, like some natural growth, changes its colour, expands or contracts with the soil and the circumstances by which it is influenced. The same grand commercial site on the shore of the Adriatic which gave Venice the key to the stores of the "exhaustless East," which brought her into the great air of republican freedom and growth, gave to her architects also the opportunity and temptation to experiment in forms of lavish and abnormal architectural splendour, while her neighbour Verona, the pocket borough of the Scaligers, remained in the more respectable beaten paths, both politically and architecturally. Which town is, in the latter point of view, of most value, may be contested; it may be correct to say that there is more for the northern architect to learn from in Verona, more to admire and wonder at in Venice. The architecture of Verona is strictly architectural, that of Venice is to a great extent more picturesque than architectural. Verona affords admirable exemplification of the treatment of material, brick and marble especially, on purely architectural principles, yet with sufficient regard to effect and variety. Of the result to be obtained from a simple and bold use of building materials, almost without actual "ornament," the famous tower of the Scaliger palace is a remarkable instance; and, on the other hand, picturesqueness of detail is seen in such things as the varied marble inlay pavements, and the famous flexible iron grille before the Piazza dei Signori. Then the details of the brick architecture of San Zenone and San Fermio furnish admirable examples of what may be called the common sense of architectural design, and yet with truly refined feeling and artistic effect. There is probably more here that is valuable for the architect to study than at Venice, where the picturesque is the predominant aim, and the means whereby this is attained will not, in many cases, bear too critical examination.

There is not room to say much now about St. Mark's, to which indeed a large space was devoted in our columns some time since; but we may quote the following description of the effect, to an English architect, of the peculiar state of the pavement, on which others have commented:—

"Of all the features of this grand church, that which next to the gorgeous colour of the walls most attracted me was the wild beauty of the pavement. I know not what other word to use which quite describes the effect it produces. It is throughout arranged in patterns common in most Opus Alexandrinum, but instead of being laid level and even, it swells up and down as though its surface were the petrified waves of the sea, on which those who embark in the ship of the church may kneel in prayer with safety, the undulating surface serving only to remind them of the stormy sea of life, and of the sea actually washing the walls of the streets and houses throughout their city. It cannot be supposed that this undulation is accidental, for had it been the consequence of a settlement of the ground we should see some marks of it in the crypt and in the walls, and some tokens of disruption in the pavement itself. And the corresponding example of Sta. Sofia, Constantinople, where we have it on record that there was an intentional symbolism in just such a floor, is conclusive as to the intention of the imitators here."

Not quite, we think. If the builders of Sta. Sofia, in the very centre of the domination of ritualistic symbolism, intended such a metaphor by their floor, it by no means follows that the architects in the free, aspiring, commercial city of the Adriatic should have set great store by any such far-fetched and absurd symbol. They might have imitated what struck them as a picturesque peculiarity in the Neo-Greek cathedral, without any other aim than a gorgeous effect. The passage we quote, and the tone which it takes, in common with other remarks in the same book, is indicative of the overwrought and entirely artificial manner in which by some architects among us, symbolism and ecclesiology are mingled with architecture, as if the two studies belonged to each other in some inseparable manner. We can only hope that no young ecclesiological architect will commence constructing churches with "wavy" floors, in order to realise among ourselves the important lessons thus to be derived. On architectural grounds there may be room for the consideration whether more variation in the levels of floors than is generally permitted in modern buildings might be a new source of effect. There are, however, very few structures built in which any such variation, either by slopes or steps, would not be a practical inconvenience; and probably the final conclusion would be that for an interior there is nothing so fine or so suitable as an unbroken expanse of flat floor as the basis of the internal architecture.*

In comparing Verona and Venice, one can scarcely forget the vicinity of Vicenza, sacred to the memory of the now barely-honoured name of Palladio. The reputation of the great Renaissance designer will probably survive after a fashion, but more on the wings of fame and because of what has once been said about him, than on the merits of what he called buildings, but which were rather full-size models of buildings. More thought and more intellect may have gone to producing some of these than went to any of the now more admired structures of the other two towns we have been referring to; they form a striking warning of the consequences of neglecting the first desideratum of architecture, truth and durability of construction. There is a something singular in the geographical juxtaposition of Verona, Vicenza, and Venice, lying at the three corners of a not very large triangle of country, representatives respectively of real architectural building, of "school" designing, and of picturesque architecture of no rule or regulation at all. The fact that the latter has the most lively hold upon the interests of most people at present must not be made too decidedly an argument in favour of the more lasting interest of the "romantic" school; allowance has to be made for the historical associations of Venice, as well as for the fact that the romance side of artistic interest is predominant just now, in every branch of art and literature. "School" art, on the other hand, always has in it the seeds of decay; yet it is not improbable that the day would have come round when the unquestionable talent, not to say genius, applied to it by Palladio might have made Vicenza again a centre of interest to the architectural traveller. But the celebrated Renaissance architect destroyed his chance by forgetting the constructive basis of architecture, and contenting himself by getting up scenic buildings as fast as he could without considering their future. He did more, however, in the art of abstract design, than that it should be quite fair or allowable, even for the most virtuous Goth, to pass his memory over it with a sneer; though every candid critic must admit how inferior in interest and association are his artificial compositions to the sometimes less artistic, but genuine and durable erections which the Italian mediæval architects, supplying the wants of their day with the materials nearest to hand, have left as illustrations of brick and marble in the middle ages.

CISTERCIAN ARCHITECTURE.

We printed three weeks ago a considerable portion of the paper on the above subject recently read by Mr. Sharpe, at the Ripon Congress of the Archæological Institute (see p. 659, *ante*), embodying facts and conclusions, some of which had previously been laid before the architectural profession in the course of a paper contributed to the proceedings of the Institute of Architects during the session 1870–71. The various studies and investigations which Mr. Sharpe has given to a subject that he has fairly made his own are now to be collected in a systematic form in a new illustrated work† on Cistercian Architecture, the first two parts of which are published, and of which we presume the remainder is to follow shortly.

The peculiar ecclesiastical movement which, started at the close of the eleventh century, has left its records in some of the most extensive and impressive architectural works of the twelfth and thirteenth centuries, has been on several occasions dwelt upon and described in its main features by the author of the present work, in the course of various lectures, of which extracts have appeared in our columns, as well as in the letters "On Colour in Churches," first addressed to us, and since printed as a pamphlet. It is, therefore, unnecessary here to recapitulate the specialities of Cistercian rule which contributed to give much of the peculiar character of stern simplicity which belongs to their conventual buildings. Those who have not yet made any acquaintance with the history of the rise of the Cistercian movement will find it sketched in the opening chapter of the work before us; it is sufficient to observe here that the order appears to have dated its great increase in numbers and reputation from the foundation of the Abbey of Clervaux, by St. Bernard, in 1119, and that within a little more than 200 years of that time no less than 1,200 abbeys were founded, erected, endowed, and added to the Order. "Of these 1,200 monasteries," says our author, "I do not know one the general plan of which is not in accordance with that of all the rest, nor a single church which does not bear in its details the impress of its Cistercian origin."

This remarkable unity of plan and design in all these buildings, not forming conspicuous objects in towns, not grouped together in any way, "*sed in locis a conversatione hominum semotis*" (in the words of their own statutes), is an impressive instance of the intimate connexion between architecture and forms and theories of life, which has always existed where the architecture was the unfettered and natural expression of the real wants of its authors; which, even at present, amid our multifarious copyism, exists much more than some pessimist critics would have us believe. Nothing can better assist us to realise the power of the ascetic spirit in the middle ages than the existence of these extensive structures, all built by one law, and all following the melancholy prescription of their statute, and finding their foundations far up in silent valleys, in the least conspicuous and least frequented spots, where their inhabitants could carry on their formal and severe discipline of existence with the least possible temptation to break through it. In contemplating in imagination these hundreds of separate silent buildings, the scene of one of the most remarkable efforts that was ever made towards the abnegation of all the brighter human feelings, in the hope of gaining a superhuman happiness, even the architectural student is tempted for a moment to forget the architectural grandeur of these structures in the moral interest of the phase of life of which they are the chief witnesses and memorials. There is something intensely solemn, though mournful, in the ideal of life thus held up and practised by whole colonies of human beings centuries ago; an ideal which, with all its lofty claims and hopes, and doubtless its strivings and contentions of mind, has utterly faded into the past, and left us as memorials these deserted and ruined structures, which are sketched and measured by the modern architect as the only remnant amongst us of the great Cistercian movement which is of any consequence to him or to any one now.

The style of the earlier and finest of these abbeys is of course the style of Early Gothic as in its main features it was practised in the twelfth century over great part of Europe, with diversities of detail rather than of construction or of general effect. The Cistercian presents it intensified, as one may say, in its characteristics of massiveness and simplicity, but not otherwise with any noteworthy distinction in style from other edifices of the same period. It was rather a distinction of manner than of style, arising from the determination to avoid all appearance of show or luxurious decoration. Any representation of human figures or faces in the carving was forbidden explicitly by the rules of the order, and even decorative carving little resorted to; and thus results a manner of Early Gothic illustrating the degree of architectural effect which can be obtained by the use of moulding only as a source of decorative expression. Towers of any height were also forbidden: "Stone towers are not to be made for bells, nor wooden ones of immoderate height, which would be unbecoming the simplicity of the order." Mr. Sharpe adds that "these wooden bell-turrets existed in most of the early French abbey churches of this order, over the crossing. There is a representation of such a turret so situated in an early engraving of the church at Citeaux, before it was destroyed, and there is one still existing at Brombach with a small circular opening beneath it, in the apex of the western arch of the crossing, through which the rope descended to the floor of the nave." The bells also were under regulation, and there were never to be two sounded at a time: no "peal" was allowed, in other words. The windows were to have plain white glass, except where coloured glass had existed in an abbey built before the institution of the order, when

* Elmes, in his original design for St. George's Hall, Liverpool, made the experiment of a raised floor all round the great hall, a kind of continuous dais, with two or three steps down to the centre area. The effect, as we remember it, was to give rather the appearance of a *well* in the middle of the area; and it was probably inconvenient, as we hear it has been some time since filled up with wooden flooring, so as to produce a uniform level.

† "The Architecture of the Cistercians." By Edmund Sharpe, M.A., F.R.I.B.A. Part I.: General Plan. Part II.: The *Domus Conversorum*. London: E. & F. N. Spon. 1874.

the coloured glass might be retained: there is in this last exception a spirit of reasonableness and an absence of fanaticism, which has not always characterised religious reforms, and from which some people even in our own days might take a hint. The general prohibition of stained glass in these abbeys has been frequently referred to of late, and was the main text of the letters "On Colour in Churches" before mentioned, in which some may have thought the example of the Cistercians in this respect was pressed a little further than most modern architects can be expected to follow it.

In regard to the disposition of the principal buildings forming a Cistercian abbey, the model plan given in this work furnishes a convenient memorandum of an arrangement to which all these groups of buildings conform, in its main features. Most of our readers will recollect the leading points of the Cistercian monastery plan; the church occupying the whole of the north side, the cloister court to the south of it; the chapter-house opening from the east walk, and the refectory from the south walk of the cloister; the fratry, or day-room of the monks, opening from the south-east angle; and the long building, generally divided by a centre colonnade into two aisles, which forms the invariable completion of the block on the west side of the cloister, but extending commonly far beyond it southwards. It is of this last building that Mr. Sharpe especially treats in the second part of the present work; the chamber to which he had formerly attached the title of *hospitium*, or guest-room, but which recent researches have induced him to regard as the *domus conversorum*, or room of the "convertites" (to adopt the Shaksperian Anglicising of the word*), frequently alluded to in the chronicles of the monks. The *conversi* were lay brethren, subject to some extent to the religious brethren, and who were admitted to the shelter of the convent on engaging to adopt the Cistercian rule of life, and to do the necessary work of labourers on what was, in fact, a great economic farming estate. From what is related of the duties of this portion of the conventual body, who appear to have really had to undertake the greater part of the rougher daily labour of these great establishments, it is justifiable to assume that they may have frequently or generally surpassed its religious brethren in numbers, and the respective proportions, in size, of the fratry and the western building, the day-rooms (according to this theory) of the religious and lay brethren respectively, are therefore in accordance with this idea. Moreover, the fact that both these apartments were in two stories, and both divided in the same manner by a central arcade, points to the conclusion that their arcs were of a similar nature; the lower room in each case being the day-room, and the upper one the dormitory; which has long been assumed to be the case in regard to the apartment called the *fratry*. On the whole the new explanation of the long west room is perhaps the most probable that has been offered; at the recent Ripon meeting of the Archæological Institute it was, in fact, generally taken that Mr. Sharpe had proved his case. We should only wish to ask what has become of the *hospitium*, which, Mr. Sharpe admits more than once, is one of the most frequently mentioned buildings in ancient chronicles? Apparently the new theory removes it from the group surrounding the cloister, and places it among the outlying buildings within the abbey precincts, where, we are told, that both at Fountains and Furness there are buildings that might have served such a purpose. As Mr. Sharpe holds that the *hospitium* would be constructed in the same way, with a lower day-room and an upper dormitory, it seems to remain really a question as to whether the guests or the lay brethren would require most room, and to which the largest apartment was likely to be devoted. There is this to be added, however, that if the lay brethren took so regular a part in the daily work of the place, it may be natural to suppose that their room would be the one in most intimate connexion with the main buildings of the convent. On the other hand, it might be argued that the working population of the establishment, employed a great deal in out-door labour, would be housed more apart, and in less close connexion with the religious service of the place: they were not, it is admitted, required to attend the same number of services as the religious brethren; and it might also be felt that a place of honour should be given to the partakers of the special hospitality or charity of the convent, and that their room should be in such proximity to the church as to enable them (including the sick, as they often did) to attend services with as little difficulty as possible. We do not say that Mr. Sharpe has not shown considerable reason for the change of nomenclature, but are inclined to think there is something to be said also for the *hospitium* theory, on the ground of convenience and suitability of plan.

Appended to the second part of the book are plans, sections, elevations, and interior perspectives of two or three of the most typical examples of the apartment under consideration: those of Vaucelair, Furness, and Fountains being selected, of which the interior perspectives of the two latter are shown; Furness, of course, being in great measure a restoration. The well-known chamber at Fountains, often erroneously called a cloister, is a remarkably fine example of how much of really beautiful and elegant architectural effect may be obtained without the assistance of ornament, in the usual sense of the term, and by the simple mouldings preferred by the Cistercian architect. Our author calls attention to the admirable way in which the plan is arranged so as to afford light from both sides to the three principal buildings, the Fratry, the Refectory, and the Domus Conversorum: this, however, is only true of the portion of the latter which projects before the line of the cloisters; and, in regard to that part even, we fear that if a modern architect sent in a plan for a building for a number of workmen,—a factory, for instance,—with no larger proportion of light than in these cases, he would be requested by the committee to reconsider his plans.

Indeed, we think our able archæological architect, in dwelling fondly on a favourite subject, has allowed his enthusiasm to carry him a little too far in his views as to the practical value to the modern architect of the study of the edifices of Cistercians. He asks, very reasonably, "Can we draw no instructive lesson for works of the present day, increasing as they continually are in importance and in the means devoted to them, from the existence of this noble school of architecture in the Cistercian remains of Great Britain and Continental Europe"? Unquestionably, in regard to the architectural treatment of buildings of a somewhat similar object, the lesson of simple yet architecturally effective planning, and of the superior effect of a style, masculine and severe in treatment, over one bedizened with ornament, is such that he who runs may read. But when we are invited to take lessons from the Cistercians in sanitary arrangements, we feel doubtful. The utilising of a natural stream to carry off the sewage, for instance, is just one of those proceedings which modern judgment and experience in such matters has condemned *in toto*. It would appear, at all events, that the monks might have made a better use of the water, had they been so minded, if one may judge by the highly characteristic little legend quoted by our author as illustrating the habits and tastes of these ascetics:—

"A cavalier of renown, who had entered the order of Citeaux, had a friend equally renowned for his skill in arms, whom he exhorted to become a monk. The latter replied in a manner that evinced, in the eyes of the monk, great pusillanimity, 'Yes, my friend,' said he; 'I would willingly enter your order, but for one thing that I greatly fear.'—'What is that?' replied the monk.—'The vermin that fill your garments,' rejoined the soldier.—'O courageous knight!' said the Cistercian; 'you, who in wars inspired by the devil do not fear the swords of the enemy, do you dread the weapons of this smaller militia that you encounter in the service of Jesus Christ?' The cavalier remained silent, and, ultimately convinced by his friend's exhortation and example, joined the order. It happened that, some time after, they met, for the first time, in the church of St. Pierre, at Cologne. 'Well,' said the older monk, 'do you still fear the vermin?'—The new monk, understanding the allusion, replied, 'Ah! my friend, be sure of this, that if all the vermin of all the monks were united on my person they could not by their persecution drive me out of the order.' The other, says the chronicler, greatly pleased with this answer, repeated it for the edification of his hearers wherever he went."

Nothing could be more characteristic of the strange *mélange* of dirt and devotion which went to make Mediæval saints than the above somewhat nasty record. But whether it tends to inspire us with much faith in the sanitary operations of gentlemen who boasted such a retinue, may be reasonably questioned.

A singular result of the peculiarly practical view taken of property in the abbey lands, after the dissolution of the monasteries, is alluded to (p. 25, Part I.); the entire preservation, namely, of the outer fence wall of the convent property, while the buildings have been allowed to go to ruin. This result is no doubt due, as Mr. Sharpe observes, "to the same cause which maintains and perpetuates the picturesque irregularity of our walls and fences, and which is connected with the testamentary identification of property, and the nature of the legal tenure of land in this country; . . . . for the arbitrary alienation and transfer by gift of the property of the monasteries, at the time of their dissolution, though it supplied to its new owners a motive for the preservation of its boundaries, laid no legal obligation on them for the maintenance of the buildings." The author, while admitting that all this is very much altered now, laments that the rough works of reparation that have been carried out in some instances have been under the superintendence of ignorant persons, and that thus funds have been expended, "a portion of which only, if properly applied, might have prevented the loss of valuable works. The instances which have fallen within my own observation of such losses which have occurred in the abbey churches of this country, since my illustrations of them were published in 1846, are both numerous and serious." Those who are responsible to the nation for the preservation of these monuments of our architecture from further ruin, should take this consideration into due account, whether they look at the matter from an economic or an archæological point of view.

* "I'll to him, I; out of these convertites
There is much matter to be learned."
As You Like It.

RUS IN URBE, AND THE DRAPERS' COMPANY.

Old London, if we may use that term with any correctness at all, is in course of such rapid disappearance that we shall in the future be thanked for having, every now and then, as opportunity offered, recorded its said disappearance in detail. It is really a melancholy thought, and leads one to reflections, artistic and architectural, not in any wise hopeful. Works of the past disappear, and the future comes in time; but how much mankind can be said to gain by the progress, we hardly dare to contemplate. "Business," as it is termed in the City,—for of City doings we are about to give a little account,—is gradually and quickly devouring all things in it, even the very ground itself. There would, indeed, be no streets at all were it possible in any way to get from house to house, or from office to office, without them. All the quiet, green spots in the City of London are disappearing, and brick and plaster houses, or boxes of offices, we had better say, are growing out of them, instead of grass and trees. There is no help for it, that is certain. But the fact may now and then be recorded with advantage, showing how the old disappears in the new. Let us give an example of it, now actually going on in the very heart of the good, and a little prosy, City, and in the very centre of its busy trade and traffic.

The Drapers' Company is, as many may recollect, one of venerable date, for on the present site of the Drapers' Hall, in Throgmorton street, Thos. Cromwell's mansion once stood. This site was purchased of Henry VIII. in 1541 but to whom, however, it became forfeited upon the attainder of Thomas Cromwell, Earl of Essex. It was much damaged in the Great Fire in 1666, but was rebuilt. In 1774 it was again considerably damaged by fire, but was repaired in the following year. It has since been fronted, and the interior beautified in 1868-9, so that this quiet little spot has seen many and enough, and perhaps more than enough, changes. The Hall is now about as fresh and new in appearance as it well can be. It may be noted that the ancient Hall of the Company stood in St. Swithin's-lane in 1402. The "Company" existed by custom in the reign of Edward I. First incorporated by the 38th Edward III., and successive charters were granted by Henry VI., Edward IV., and confirmed by an "Inspeximus" of Elizabeth; again by James I., and by Charles II. Articles too, and ordinances for the good government of these worthy citizens, were made by the Mayor and Aldermen, on March 9th of that year. Sir Nicholas Bacon, Knt. Lord Keeper; Sir Christopher Wraye, Knt., and Sir James Dyer, Knt., the Lord Chief Justices, confirmed their bye-laws on November 18th, 1576, so that we see how venerable the history of the Drapers' Company really is, and how proud a thing to belong to so historic and venerable a guild. We need not describe their "coat of arms." The motto of it is,—"Unto God only be Honour and Glory." Their *Patroness* is the Holy Virgin Mary. Do the Company, we may ask, think enough of all these things?

What shall we say of the "Fees"? of the multitude of charities? of the very first, to wit, wherein one Thomas Howell, who died at Seville in 1540, and who sent to the Master and Wardens of the Company "12,000 ducats of gold"? The said Company being required to buy with it, 400 ducats of rent yearly, *for ever*; this sum to be bestowed as a marriage portion upon four maidens, being orphans of the donor's lineage, or blood, if they can be found; if not, the 400 ducats are to be spent in marriage portions to "four poor maidens for ever." What do the Company now-a-days do with these 400 ducats, and where do they find the "four maidens," and where are they? Many other charities there are, worth, perhaps, the looking a little into. Loans, too, there are, and almshouses, formerly in the parish of St. Olave, near the Tower of London, but since removed to Tottenham. Then there is Queen Elizabeth's College, at Greenwich, under letters patent, for twenty poor persons; and Lady Ascue's land in Beech-lane, to build almshouses for seven poor widows; and almshouses at Stratford, Bow, for eight poor people, and for the schoolmaster and usher of his school. And, not to mention others, Henry Lucas left no less than 700 pounds sterling for the building and endowing a hospital in the county of Berks, or Surrey. Many others there are; and the goodly list shows how free men are with their worldly goods when their last hour does indeed draw near. But once more. Deputy Corney left by his will property to establish orphan schools in Lordship-lane, Tottenham; the scholars to be of respectable parents, and members of the Church of England. This seems to have been the last act of the goodly Company, for these schools were but opened in 1870. One other matter, not a little significant of things as they change, we must needs note. In the list of to-day of the Master and Wardens and Court of Assistants of this goodly Company, all the places of abode given, without exception, are away from and out of the City of London,—fashionable Tyburnia, Blackheath, and the "West End,"—have decoyed these good and most worthy London citizens from their City, to forget it, if possible, in their hours of leisure!

And, now, for an account of another change about to come over the belongings of the Drapers' Company. Their Hall, a new building, is, as we have said, in Throgmorton-street, and at the back of it, through the Hall, or down a narrow court at the side of it, there is to be found a nearly square plot of right pleasant garden-ground, with grass, and a fish-pond, and goodly trees, pleasant to eyesight, and contrasting happily with the surrounding bricks and new plaster, and staring stone-work. It is some 200 ft. square. It is a *terra incognita* even to practised Londoners, for few can know anything of it, or even of the fact of its existence. This plot of pleasant planted ground in the brick and plaster desert has Copthall-court, of famous memory, on one side of it; London-wall to the north; Bell-alley on another side, the west; and Austin Friars on the east. We have had opportunity of seeing this "*Rus in Urbe*," and have dotted down a few notes about it, and its now certain fate. It has been determined, but a few days ago, to build nests of offices, as they are expressively termed, on it, so that in a few months,—for they are not long about such work in such a place,—this green and pleasant spot will disappear, and "offices" only be in the place of it.

But to a few details, and particulars of this unique bit of ground. The Drapers' Company, having no special sentiment about it, determined to sell or lease it for building purposes, whether or no. One curiosity and perplexity there always is in plots of ground like this, all surrounded with thickly-set houses: viz., the question of window lights, or openings, or easements in walls. Here there are many, 91. being paid by one firm for nine windows, overlooking the garden. Notice to close these lights has however now been given. Science, too, must needs succumb as well as nature, before the movement of the Drapers' Company; for it is expressly provided that the telegraphic wire which a great trading firm, the Messrs. Waterlow, have now the privilege of maintaining, and which is extended in air, and passes over the grounds and buildings of the Company, and which they hold at a rent of 2s. 6d. a year, shall cease at any time, due notice to remove the same being given in writing to do so. All the buildings are to be completed within twenty-four calendar months.*

* The plot of land has been let we are told, for 15,000*l. per annum*, on lease for eighty years.

It will, of course, be in the recollection of many that some talk there has already been for retaining this plot of pleasant garden-ground for the "recreation" of the public, and we could wish that this should be, could but the present aspect of the place be retained as it is, for it could hardly be bettered. There is about it just that balance of the artificial or garden-like laying-out of the ground, with a certain look of wildness, and neglect, if you will, which is suited to the spot. Dickens would have revelled in it, and peopled it with creations of his own; and going to it now as it is, any one with an imaginative faculty may do so too, and that right pleasantly and quaintly. We must not forget to mention that a right of way and passage, or narrow street, is to be made through this quiet bit of ground, from Throgmorton-street to London-wall, almost due north and south; of no moment when built upon, but altogether ruinous to the quiet of it as it is. Standing on this spot, and looking westward, a quaint bit of antique London may yet accidentally be got a glimpse of, for the houses in Bell-alley are somewhat of the oldest, and dilapidated, with huge dormer windows, and unimproved dull red tile roofs. But all these will go, it is quite sure and certain. Fate and business will needs have it so; as well as the spirit of "improvement," to take up the favourite and fashionable word. Improvement is a mighty word, and all-potent in the "City"; and the idea conveyed by it, true or false, does not stop at the word, for the wealth of the place, and the dreams of more and more of it, compel to action, and all and everything, however time-honoured, or even full of poetic power, vanishes before them. *Improvement* in the City means in brief the pulling down of the well-used and the putting up of the quite new. There is but little thought of their relative value, either artistically,—if the word has here any significance at all,—or in other ways; anticipated profit, even more than bare utility, dominating everywhere. All things go before it, both of nature and art. Gardens and green spots, and trees, and churches, and remains of the past,—all and every one of them disappear in turn. We may lament this, but we cannot help it. But more, perhaps, than all is the dismal, the thrice dismal, fact of these new and improved, and may be patented, details of house and office building, being for the most no improvements at all, either in artistic power, architectural skill and design, art workmanship, or even in what is expressed by the English word comfort, or in convenience, in as far as these are elements in the changes that are made. Accepting, therefore, for a moment, the necessity that may exist for the building over of this plot of green-covered ground, in the midst of the too crowded City, and that no fraction of mother earth within London-wall can be otherwise or better utilised than by its being covered thick and closely with "offices," why should not such houses be at least as "comfortable" as those built in the days of Inigo Jones and Christopher Wren? We speak from experience and actual eyesight, and trial of both, without exaggeration or prejudice, and must say that not only have we in this improved age not beaten Jones and Wren and their immediate followers in the art and mystery of house-building, but we have not as yet equalled them, with all our new appliances and scientific helps.

We here specially note this both as constructively and artistically viewed, and may be for guidance; for on this special spot there is a right good opportunity. London is yet,—in spite of all pullings down and removals of the so-called worn-out and out-of-date,—full every here and there of quaint spots and bits of architecture, and even of poetic remembrances in dreary nooks and corners. Many of the antique streets are yet in existence, as far as the *plans* of them go; and the irregularity of house pulling down and improvement, necessitating differences in size and height in the houses which make up the crooked street, leave the idea of it as it was almost intact. They contrast as much as can be with the quite new and orthodox system, as seen in the outskirts of London, where the fresh streets, whether broad or narrow, are made up of long straight double rows of brick boxes, even in height and alike from end to end, without character, and without individuality or interest of any kind. So the old city of London, in spite of improvements, yet remains to a certain extent, and has in it a something to remind us of the mystic past, out of which it originally sprang, and before the patented engine cut out all things from the same model pattern. These City guilds, as we think, should prize these memories, and should go a little, now and then, out of their way to cherish them. It is worth a little sacrifice to keep these, and the quaint "halls" of the great City companies may be looked on as centres from whence such influences may be expected and ought to come. It is now the Drapers' Company's turn.

FRENCH EXCURSION OF THE ARCHITECTURAL ASSOCIATION.

The reunion of the steady excursionists of former years has taken place, and all gaps in their number are supplied plenteously with recruits, coming, it may be noted, from pretty well every district of the United Kingdom.

Mr. Edmund Sharpe, under whose guidance the whole of the Association excursions have been undertaken, has, as usual with him aforetime, sketched out, in an introductory speech, the nomenclature he proposes to use in all his descriptions of buildings, noting also, of course, by the way, some principal points of distinction between English and French work of the same dates. Allowing for a much condensed form, the following is the substance of these preliminary explanations:—

The periods of French art from the earliest times to the Renaissance are:—I. Romanesque; II. Transitional; III. Lancet; IV. Geometrical; V. Early and Late Curvilinear; this being followed by the Renaissance. This nomenclature is, for convenience, made to follow that pursued on other occasions for the English styles. Names are really only means to an end. The end in this case is the easy comprehension by all of each other's meaning. Whether the names and the details they express are accepted fully for the future or not may be a future consideration.

I. *Romanesque.*—Nothing in French building corresponds exactly with English Saxon work. There are only the buildings of the time of Roman rule, and an earlier phase of our Norman work. This latter derives its characteristics apparently from the Roman remains, found in such considerable quantity near at hand. The possession of less skill on the part of the constructors made their work "a degraded Roman,"—or (following Dr. Whewell), "Romanesque." [A Greek influence is suggested by a member, through a Greek colony in Provence, who practised their art, as well known to them, and gave, *e.g.*, to capitals the bevilled leaf edges, &c., not to be found in ordinary Roman work.]

Dates of period: after the Roman period,—a dark age, and barbarous designs and execution; about the year 800 some renaissance; thence to 1130 copies and adaptations of Roman work made with skill in the latter part of the period.

II. *Transitional.*—Pointed arches as arches of construction may be found about 1120; the pointed arch took strong hold in France in the latter half of the twelfth century. This work resembles in foliage, &c. (the Transitional volute, &c.), the Transitional work of England. Mouldings somewhat modified from the Romanesque, but not to the extent of English Transitional from Norman. Abacus of cap—square in section and square on plan. Dates of period: 1120 or 1130, to 1180.

III. *Lancet.*—Broad pointed lancet windows used in this period, though few remain,—having mostly been replaced by others at a later date. It might, perhaps, be termed a continuation of the Transitional period. The foliage wants the delicacy and elegance of English contemporary work; double rows of leaves round bells of caps (at Mantes just in true Transitional time) maintained till the end of this period. Mouldings have more relief than before,—pronounced quirks; but none of the infinite variety and rich groupings of English Lancet. Date of period: 1180 to 1230.

IV. *Geometrical.*—The grand period of French Mediæval art. Has tracery of circles and circular arcs. Forty cathedrals stated to have been in course of erection in France at one time in this period. Foliage—both conventional and natural. The latter adopted and then dropped in England;—probably there are not twenty examples in England of the same kind as Southwell Chapter-house. With us thus tried and found wanting. In France the habit maintained itself longer. [Not a good habit.] Mouldings show little change from the previous period. [In Normandy is found some true Lancet work,—having English characteristics.] In France Geometrical work was in use earlier and later

than in England. Date of Period: 1225 or 1230 to 1320.

V. *Curvilinear.*—In this period tracery has the ogee or return curve. The later Curvilinear known as Flamboyant. Impossible to mark a date of general transition to those flame-like curved forms in tracery. The west front of Abbeville Cathedral is the grandest Curvilinear work in France; designed and executed throughout in the purest and best feeling and spirit. At Senlis is wonderful (extravagant) Curvilinear work,—with great ingenuity, fertility of invention and clever execution. Date of period: 1320 to say 1520 (Francis I. began to reign 1515).

The Archbishops and Bishops and the Ministre des Cultes have given authorisations, and used expressions of goodwill towards the conductor and the excursion party; and from the curés of the parish churches letters have been received which show—if any one wants convincing of the fact,—that in France, as in best parts of England, no little pride is felt in historic monuments. Perhaps a few sentences from the communication of the worthy priest of Auvers-sur-Oise may be read with some satisfaction for other reasons also:—

"Accoutumé de longue date à apprécier hautement la Nation Anglaise, son esprit sérieux, naturellement religieux, et plein d'admiration pour tant d'autres éminentes qualités qui nous manquent, hélas! je bénis Dieu à la pensée de me trouver bientôt en contact avec nombre de membres choisis de cette illustre nation, et me félicite qu'il me soit donné de leur être quelque peu agréable."

Our younger architects on tour,—thus constituted a very representative body,—have visited some of the many buildings of which they are to take stock: when a little further movement has been made the details of the progress will be chronicled.

Paris, August 18.

THE SOUTH-WESTERN RAILWAY COMPANY'S ARCHES IN LAMBETH.

The Lambeth Vestry are about to institute legal proceedings against the South-Western Railway Company in respect of their arches carrying the railway over several parts of Lambeth. The vestry complain that they have been unable to induce the company to make their arches water-tight, although some time ago the company gave an undertaking to remedy the evil complained of. This undertaking not having been complied with, the vestry at their meeting last week passed a resolution to the effect that as the railway company, after a year's notice, have neglected to prevent the percolation of water through their railway bridges, to the serious annoyance of the public, the clerk of the vestry be directed to take proceedings against them, according to Act of Parliament, for a nuisance.

OPENING OF FIVE SETS OF BOARD SCHOOLS IN SHEFFIELD.

The Walkley School was the first on the programme for the opening ceremony. It is built at the junction of Greaves-street and Walkley-road. The ground-floor gives accommodation to infants, in a spacious school-room, the plan of which is in the shape of the letter T, 54 ft. long and 41 ft. across the widest part; and there are also two class-rooms and a manager's room. There is, in connexion with the girl's division, a kitchen, fitted up with cooking-range. Lavatories and cloak-rooms are provided for the three divisions; and in separate parts of the building are lavatories, &c., for teachers. The boys and girls are on the upper floor, and each division has a school-room, with three class-rooms opening out of it. The ventilation of the various rooms is secured by an arrangement of inlet grates in the floors, direct from the external air, and outlet grates to extracting flues and chambers. Both inlets and outlets are under the regulation of the teacher to any degree. This system is being applied to the other schools in course of erection. The upper parts of the windows are hung as swing casements, are opened and closed with cords and pulleys, and are so arranged as to prevent down-draught. The staircases are all of stone, and both ends of each step rest on solid walls. There are no winding steps with pointed ends. The doors inside the building have plate-glass in the panels, so that the head teacher can easily overlook the class-rooms and lobbies. All the rooms and passages are lined with boarding up to the window-sills, and above that height are plastered and tinted. The ceilings are plastered and have cornice mouldings, and, with the varnished timber-work of the roofs (which is displayed in the upper story), together with the abundance of light, present a cheerful appearance. The woodwork is all of varnished pitch pine, except the projecting moulding on the top of the boarding of the walls, which is of oak. In the playgrounds there are covered play-sheds and numerous offices. The walls are all built of stone, and the building occupies a prominent position, and simple ornamentation is introduced. The area of the site is 2,800 square yards, and the cost of, including a number of houses and other buildings which have been removed, was 900*l.* The contracts for building, fittings, and furniture amount to 5,600*l.* 10*s.* The areas of the several rooms amount to 7,447 superficial feet, and the cubical contents of the rooms to 120,057 cubic feet. Accommodation is provided for 709 scholars. The contractors who have carried out the several works are:—For the masonry, Mr. J. Redley; joinery, Mr. J. Spink; slating, Messrs. Ellis & Wetherill; plastering, Mr. A. Berrisford; plumbing, Mr. R. J. Walker; painting, Mr. Hepworth. The desks are arranged so as to seat the children in pairs, on the plan patented by Mr. J. F. Moss, the clerk to the Board. The gasfitting has been carried out by the Sheffield Gas Company; and the fittings have been manufactured by Messrs. Brawn & Downing, of Birmingham, from the architects' designs. The stoves in all the class-rooms are by Messrs. Longden & Co., and the warming apparatus for the large rooms has been fitted up by Mr. R. R. Gibbs, of Liverpool, on the hotwater high pressure system known as "Perkins's Patent." The carving has been executed by Mr. Harry Hems, of Sheffield and Exeter, under the immediate superintendence of the Board's architects, Messrs. Innocent & Brown, of Sheffield.

The Crookesmoor School is near to the vestry offices. The principal front is towards Oxford-street, which will be continued upwards from Upperthorpe, and will form an important thoroughfare. This building, like all the others, is entirely of stone. There seems to be an abundance of windows. The doors are wide, and easily accessible from the street. There are two gables in the centre of this front, which have ornamental tracery windows filled with geometric glazing. The chimneys are made to serve as extraction-shafts for ventilation, and their appearance is heightened by the use of red Berkshire ridge tiles and finials. The whole is surmounted by a timber bell-turret. The ventilation is simple in working, and (in theory at least) requires only the slightest attention on the part of the teachers. Thermometers are fixed in all the large rooms. The infants are again placed upon the ground-floor. The large school-room is T shaped, is 20 ft. wide in the narrowest part, 48 ft. in the widest, and 54 ft. long. There is, of course, a gallery in this room, and there are two class-rooms, one of which is provided with a gallery. There are a manager's room, kitchen, and teachers' lavatories at opposite ends of the building. The boys and girls are on the first floor, each having a schoolroom in the shape of an L and three spacious class-rooms. The yards have been asphalted by Messrs. Watson, and there are covered play-sheds for the health and comfort of the scholars. The style of work is very much like that seen at Walkley, and the same tradesmen have been employed upon the fittings. Mr. J. L. Dowling is the contractor for the mason's work; Mr. J. Robertson for the joiners' work; Messrs. Harrison & Chadwick for slating and plastering; Mr. W. Bissett for plumbing and glazing; and Mr. Hepworth for the painting. Mr. William Dickenson has been clerk of works on this school and the one first visited. The area of the site is 2,100 square yards net, and the cost of it, including the roads and their making, was 900*l.* The various contracts amount to 6,390*l.* The superficial area of the rooms amounts to 7,947 ft., and the cubical contents to 126,725 ft. Accommodation is provided for 779 scholars.

Lowfield School is built at the junction of Queen's-road with the Chesterfield turnpike-road. This school differs from the other schools in having all the rooms upon the ground-floor; the girls and the infants being in one block of buildings, and the boys in a detached building fronting to the other road. One of the class-rooms in the girls' department, called "the sewing-room," is circular in shape. It is placed to fit the circular junction of the two roads. The infants' school is 50 ft. by 25 ft., and over 20 ft. high. It has two class-rooms. Each of the other departments has a large schoolroom and three class-rooms. The building is also of stone, and of the same character as those already described. The buildings of the School Board are easily recognisable as parts of a set; although not like each other in planning or detail. The school is a one-story building, unlike the others in arrangement however. The site contains a net area of 2,500 square yards, and was purchased for 1,437*l.* 17*s.*, including all the charges for roads, &c. The contracts for the various works amount to 5,715*l.* The floor area of rooms amounts to 6,690 square feet, and the breathing space in the rooms is 118,272 cubic feet. There is accommodation for 705 scholars. The masons' work has been executed by Mr. J. Butler; joiners' work by Mr. H. Holmes; slaters' work by Messrs. Harrison & Chadwick; plastering by Mr. A. Berrisford; plumbing and glazing by Messrs. W. Bissett & Co.; the painting by Mr. J. Putterell; and the palisading by Messrs. Davis & Wilshaw.

The school at Attercliffe is situate in Baldwin-street. The front is two stories high, the infants being, as usual, placed on the ground-floor to avoid steps. The play-grounds are spacious and well-arranged. Our previous descriptions apply to this school, so far as the general features are concerned. Mr. J. Milner is the contractor for the masonry, Mr. T. Bonington for the joinery, Messrs. Harrison & Chadwick for slating, Mr. A. Berrisford for plastering, Mr. R. J. Walker for plumbing and glazing, and Mr. J. Standall for painting. The area of the site is 2,000 square yards, and the cost was 941*l.* 7*s.* including roads and sewers. The building, fittings, and furniture cost 5,424*l.* The area of rooms altogether is 7,650 superficial feet, exclusive of passages, and the cubical contents of rooms, 121,555 ft. Accommodation is provided for 734 scholars.

The Carbrook school stands on a site fronting the Tinsley-road. A large gable facing the road contains a pair of triplet windows on the upper floor, and smaller windows beneath them; the whole being crowned by a stone belfry. The gable is flanked by wings, which contain two light windows canopied by gablets, and divided by buttresses from the central compartment. Internally the woodwork is of pitch-pine, the steps of stone, the walls part boarded and plastered, and the ceilings plastered and moulded. The boys and girls are on the upper floor, each having a school-room and three large class-rooms. The infants are on the ground floor, with spacious school-room and two class-rooms. Galleries and all needful fittings are provided, and there are lavatories, cloak-rooms, &c., as in the other schools. The stove-grates in the class-rooms were made by Messrs. Longden & Co., from the special design of the architects. They make a complete front, with stove and chimney-front in one piece. Mr. Gibbs fitted the warming apparatus for the large rooms and passages. Messrs. Brawn and Downing manufactured the gas-fittings. Mr. Thomas Hopkinson, of Retford, was the contractor for the masons' and joiners' work; Messrs. Staniforth & Lee, for slating; Mr. C. Unwin, for plastering; Messrs. W. Bissett & Co., for plumbing and glazing; and Mr. Hepworth, for painting. The site contains 2,400 square yards net, and was purchased for 1,200*l.* The various contracts amount to 5,994*l.* The total area of rooms is 7,596 superficial feet, the total cubical contents, or breathing-space of rooms, is 124,922 cubic feet; and the accommodation, upon the method of calculation of the Education Department, is for 731 scholars.

Messrs. Innocent & Brown have published, in an available volume, illustrations of these and several other schools erected under their direction for the Sheffield Board, and to which we may find another opportunity to refer.

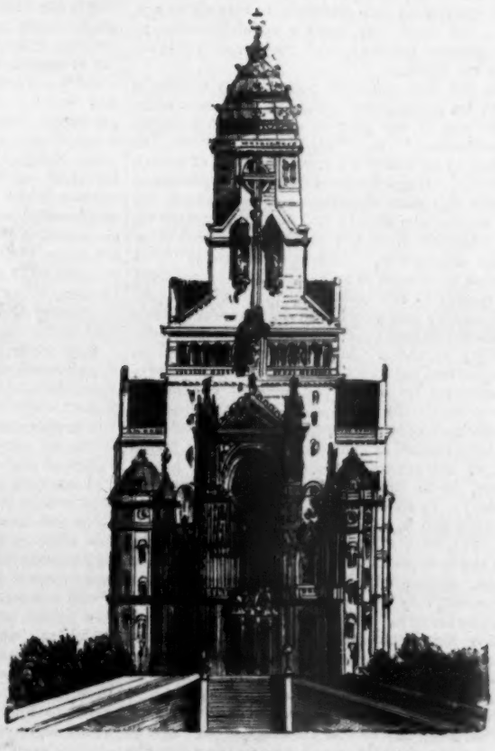
The Surveyorship of Penzance.—Mr. G. H. Small, a son of the Gloucester city surveyor, has been appointed borough engineer and surveyor to the corporation of Penzance. There were between fifty and sixty candidates for the appointment, which number was ultimately reduced to five, who underwent a close examination, lasting several hours, after which Mr. Small was unanimously elected.

COMPETITION DESIGNS FOR THE CHURCH OF THE SACRED HEART,

*Intended to be built at Montmartre, Paris.**

By M. Abadie.

By M. Davioud.



By M. Moyaux.

COMPETITION DESIGNS FOR THE CHURCH OF THE "SACRÉ CŒUR," PARIS.

It is proposed to build a large church on the hill of Montmartre, which will dominate Paris, and be seen far and near. The sum named for its cost is 280,000*l.*, including the decoration and furnishing, and certain residences. Premiums are offered for the best ten or twelve designs, which are to become the property of the authorities, who do not pledge themselves to employ the author of the best design or of any of the designs, but reserve to themselves the right to call in any person they please to amalgamate, if they so choose, the best points of all the designs they reward. Two sets of English architects were foolish enough to waste their time in preparing designs, and, as a matter of course, are "no where" in the judges' list, if the published accounts be correct. The jury of selection includes a certain number of architects, who are doubtless doing what they believe to be right.

Seventy-five sets of designs have been sent in,

* See also p. 708.

from which the jury have selected. The whole have been exhibited for a few weeks in the Palais de l'Industrie, in the Champs Élysées.

We give engravings of sketches of seven of the designs, four of which,—namely, those by M. Abadie, M. Douillard, M. Davioud, and M. Moyaux,—are amongst the thirteen selected by the jury for reward.

THE POWER OF MODERN "MECHANISM": ITS INFLUENCE ON ART.

The world has been told more than once, and with no little authority, that we are remarkable, if for anything in this age and in this country, for our most wonderful power of "mechanism." No one, who will think about it for a moment attentively and seriously, can possibly doubt the potency of the machine; for a visitor to any one of our famous manufactories, giving but a glance at what is going on in it, must feel assured that mechanism is gradully and certainly taking the place of the human element, which has hitherto been a part, and an essential part, of mundane work. It would be very difficult, indeed, to find in the nature of things a more foundationally suggestive subject of thought, as one more capable of influencing practice and practical life, than this of the ever-growing power of mechanism. The subject just now is more than usually interesting from the fact of its taking a somewhat leading part in the discussions of the various scientific bodies which meet for "conferences" at this season of the year. We might specially refer to the address delivered to the Mechanical Engineers by their President, wherein the "power of machinery" is made to be all but omnipotent, even as things are; but in the future promises to be absolute master, almost of men's thoughts; and when the whole human race shall combine its powers—powers which, when isolated, accomplish such marvels—its good, and its possible evil effects, may surpass even our dreams. A few thoughts, then, on "mechanism," as it progresses and promises to rule all things, even art itself, may have a special interest at the present moment, and may rouse a thinker here and there.

In the first place, to philosophise a little, it must be remembered that the time was when there was, in our present sense of the word, no "mechanism," no "enginery." Force, or power, to do heavy work, was got out of human strength. Huge bodies of men, as represented in the Egyptian drawings and sculptures, did the work of the world; and dug and brought up the materials from the earth, and moved them about afterwards. Levers and ropes were all that were used to move the huge Colossi from the quarry to the temple, for which they were sculptured; and kings even do not seem to have disdained to look on, if not to "superintend" the moving of them. All the great and famous temples and public buildings of antiquity everywhere—for let us for the moment confine our attention to the mechanical force utilised in buildings—were put together, we are quite sure, without the aid of the steam-engine, that magic bit of mechanical engineering, which, but to name, is to explain the progress of modern society. In all antiquity there was most surely nothing like it, or in any way approximating to it. Yet, with all this deficiency of mechanism, did the antique times, and the men who lived in them, accomplish work which we nowadays strive our very utmost, in vain too, to rival, or even to imitate. Why is this? Is mechanism, which Mr. Bramwell so vaunted before the mechanical engineers, a thing to be regretted, or is it a thing misused, or is it indeed a something which we have yet to see into the true nature of; and to use, but not to over-use.

Tredgold, one of the founders of the age of mechanism, for this is not too strong a term to use here, said that, "Engineering is the art of directing the great sources of power in nature for the use and convenience of man." Accepting this broad definition, the president went on to prove, by a variety of proofs, drawn from every source around us, that we owe—to express the idea in one single word—"Civilisation" itself to the efforts of the mind and body of the mechanical engineer, and to the mechanism which he has created. Indeed, so triumphant is the result of his labours in these latter days, that it is no unreasonable boast to add that we may confine our thoughts on it to a very limited range of time, for in mechanical engineering, unlike the work of the poet or of the sculptor, or the painter, or the architect, we have not to go back to past ages to find its triumphs. In fact, so little is to be gleaned from antiquity, that the president declares that he will not be tempted even by the great name of Archimedes to advert to ancient engineering; but will limit himself to the lives of those now present amongst us. Now, this is really to say a triumphant thing, and to mark the age in which we live with a mark which cannot be missed or mistaken—for what more can be said? Who else can make such a boast as this, and with so much of truth in it. But is it in truth, and in logical fact, the whole truth, and a thing so very much to be boasted of. Ought the age, the nineteenth century, to be so very proud of this absolute supremacy of mechanism. The machine doing all things, all but thinking for us, certainly communicating and recording our thinkings. Almost monopolising them. We are inclined to think, looking about us for a brief moment, that there is far more in the nature of things than this; and that even the conversion of a "tea-kettle into a locomotive" may be surpassed, at least as a matter of human interest and feeling.

It is, by way of illustration, not a little curious to note the distinction between the past and the present, in their mode of work, and in the character of the work produced, and in what is perhaps more, the mental impression made by the work after it is, by whatever means, brought into being. Of course, we all allow, without a word, that the more easily and cheaply necessaries, of whatever kind, are brought into existence, and distributed, the better it must be for human nature generally; and did the machine but stop here, no one could say a word. But it so happens that the machine which does one thing so well, and so cheaply, and in such quantity, may be made, and is made, to do other work, and pretty nearly all work. The all-potent mechanism can, as the engineer boasts, manufacture nails and sweet biscuits, by the ton, and that it can do almost without touch of the human hand: all we have to do is to stand by and look at it at work. It is simply marvellous. But it can also,—and here it is that the artist has good reason, now-a-days, to tremble a little,—not only make bricks, and saw and plane timber, but it moulds them into "gracious forms," and, what is more, in every stage of the manufacture and making of the materials which form our garments, from the very coarsest to the very finest, it can, and does, do its entire and triumphant work. From the finest lace, says the president of the engineers, to the sole of the stoutest boot! Indeed, it is even so. It is no exaggerated boast. He stops here as a faithful mechanician is almost bound to do; but we may ask again, is this all pure gain? Is there nothing wanting? Is it a complete triumph, and a national success, when it is said, that the "machine" is driving the human being fairly out of the field, and doing all his work for him?

And while this is, as must be confessed, no exaggerated or enthusiastic statement, but a sober fact, that machinery, even now, is doing almost everything, more or less perfectly, which the human hand is less advanced days did sometimes so very well, it is not enough for the future of engineering aspirations; for we know, and no man certainly can deny its possibility, that within the next fifty years "great inventions will be made," and we are sure that any one, looking back to the condition of things in engineering science at the present time, and comparing it with that which he will then know, "will wonder how it was that the men of this day failed to make many a grand discovery which, at that time to him, will be as familiar as the steamboat or the locomotive is, now-a-days, to us!" We think we might even go further than this in mechanical prophesying, for what is there to hinder the production of everything about us, or which we see, or make use of, including even "gracious forms," as the president has it, but the putting the machine to it. Art,—*fine art*,—for example, to take an extreme case; why, as it is, statues are all but the result of elaborate and ingenious machinery applied to the formless marble block. They may be, and are, multiplied almost indefinitely by aid of machinery. Pictures,—there are many who may not know it,—are copied, if not actually produced, both for export and import, by machine processes, the hand of man doing but little else than touch up and dovetail together discordant parts. A wonderful process, and ingenious enough. Of architecture we need but to name it, for where would the smart "ornamental moulding" of the shop be were it not for the all-potent machine which produces it by the mile? We do, indeed, owe, as we are reminded, our dwellings, as well as our clothing, to the skilful labours and thoughtfulness of the mechanical engineer. It would be a right curious inquiry to go through, specification in hand, a quite new and smartly-built modern dwelling-house, and note down accurately the details of work—the pure and simple work,—by the hand of the workman; and on the opposite page of our notebook, the work done wholly by the power of machinery—by almost living mechanism. And then we might go a little further with the said inquiry, and afterwards quietly compare the final result, when all is accomplished—the perfected modern house with a dwelling-house of the same size, built in a past age, and before any one of our modern mechanical appliances had any existence, and then note well, artistically and otherwise, the difference between them. How things change, as time goes on, and as they appear to different minds, and how that which is looked at by one human intelligence, as a dead antiquity, and a something waiting to be improved away, like a City church, is regarded by another as good "precedent" to go by, to wonder at, and even to try to copy, sometimes, by and through this power of mighty machinery.

But is this, and we ask it once more, *all* gain? Is it a good thing, and an advance on the old ways of work, to bring in the mighty machine whenever and wherever it can be brought in, and to discard at the same time the hand of man? Surely it cannot be so, for a something *must* be lost by it; viz., that individuality of feeling which can only be impressed on Nature's materials by the intelligent hand of man! Such a structure as the Parthenon could not by any possibility, by any power of ingenious machinery, be produced. A mechanical dead copy of it might be, there is no doubt, quickly, and may be cheaply, produced, but the whole Classic spirit of the great original must needs be lost in the mechanical processes. Of Gothic work, it need hardly be said that it is in its very essence opposed to this mechanical mode of production, and to that uniformity and sameness of detail which is the necessary result of it. The Doge's palace, to wit, could not be carved out by a machine, however potent, neither could a copy by machinery be made of it. And may not the like be said of every real and individualised work of art, however small and apparently insignificant? It is impossible to infuse soul, or life, or poetic power, into material forms by any power of machinery. The dead forms may be there, but the spirit is absent.

May we not, therefore, conclude that one, and not the least, of the problems of the future of human nature will and must be, not how much the machine may be made to do, and how far it can be made to take the work from the human hand, but, most momentous thought, where must we stop? Where does the legitimate action of the machine really cease, and where must the hand of the workman and artist come in, and the engine cease its whirling? It is not how far the machine can be made to do all things, including even the production of "gracious forms," in the future, but where is the ability, whether natural or acquired, to distinguish between the gracious form, as produced by a machine, and the same form when the result of the hand, directed by the mind, of the artist workman. Then, and then only, will it be found out wherein the true and legitimate action of the wondrous modern "mechanism" lies; what it can do and ought to do, and what it cannot really do. A great problem for the future.

ASSOCIATION OF MUNICIPAL AND SANITARY ENGINEERS.

A district meeting of the Lancashire and Cheshire branch of the Municipal and Sanitary Engineers was held in the Mayor's Parlour, Municipal Buildings, Barrow, on the 7th. Mr. T. C. Thorburn, of Birkenhead, occupied the chair.

Mr. Jacob, borough surveyor, read a paper on the rise and progress of Barrow.

In reply to several queries, Mr. Jacob explained the formation of back streets of the town, and said that the reason they were made so wide was simply for the sake of ventilation. They had also reason to know that there was a great deal of overcrowding in the town, and as people persisted in keeping hen-coops, &c., in their yards, it was necessary for them to have plenty of room. They had got the power to have these back

streets any size they liked, by a special Act of Parliament under which they had made bye-laws. Regarding the water-closet, they found no difficulty in having them made, and their only trouble was the occasional scarcity of water.

The Chairman said they were very much indebted to Mr. Jacob for the kind pains he had taken to prepare and read that document for the information of the members of the Association. He (the chairman) could remember Barrow when it was very like the representation of it on a plan which he saw of it as it was in 1849 on the walls of that room. He very well remembered a few cottages being the only buildings where Barrow now stood, and the old landing-stages where the iron ore was shipped. With the exception of one or two cases he did not know that Barrow had a parallel in England for rapid growth, and it certainly had greatly increased during the last decade, and its population was evidently increasing at a greater ratio still. Middlesbrough, he instanced, had risen with equal rapidity; there was another town in South Wales, and his own town, Birkenhead, had risen from a mere congregation of hovels round an old abbey to a town with a population of 100,000. He had known Barrow for thirty years; and, indeed, it was in this part of the country that he stretched his first chain. He could, therefore, look back with experience and satisfaction at its rapid rise, and he hoped the town would continue to prosper as it had done, and he was sure it would receive the good wishes of every one present.

The members visited the docks, the ship-building yard, the Hæmatite Iron and Steel Works, and afterwards proceeded to the Abbey, where they dined.

The fifth meeting of the District Committee for the Midlands will be held in St. Mary's Hall, Coventry, on Saturday, the 29th of August, 1874. The Coventry sewage works, and the water-works, reservoirs, and pumping station (the Diamond Boring Company being engaged at the present time), and the fancy silk factory, will be inspected, and descriptive papers will be read.

THE OUTING OF THE SUSSEX ARCHÆOLOGICAL SOCIETY.

On the 13th inst., the Sussex Archæological Society held their annual meeting, this time at Castle Goring, by the kind permission of Sir Percy Burrell, bart., M.P. The place of assembling was Lancing, where upwards of a hundred archæologists, gentlemen and ladies, assembled, with umbrellas and mackintoshes, to keep off the rain, which fell most bountifully; and which, if it did no other good for them, certainly most effectually laid the dust. A good supply of Worthing carriages, open and shut, took the visitors to the interesting churches of Sompting, Broadwater, West Tarring, and Clapham. They also visited the fig gardens at Tarring, where many of the trees are supposed to have been planted by Thomas à Becket; and here are to be seen the remains of his palace, now used as a school. They were also to have seen the birthplace of John Selden, at Salvington, and the remains of Durrington Chapel; but owing to the rain, which still continued, they did not. Why they did not go to Lancing Church, which was so short a distance from the place of meeting, no one seemed to know. At Sompting, Broadwater, and West Tarring the Rev. W. Powell read interesting accounts of those churches from various books, with which he had provided himself; and the Rector of Clapham, the Rev. A. Barwell, read a short paper in and on his church. Mr. Barwell said, with reference to the close way in which Sir Gilbert Scott had adhered to what he believed to be the original character of the church, that, pointing to the font, which was entirely new, from Sir Gilbert's own design, there was no font before; but, since the church had been restored, the fragments of the old font had been discovered buried in the churchyard, and on their being put together they minutely corresponded with the font which had been made from Sir Gilbert's design! Sir Gilbert must certainly have been inspired on that occasion. Every one then went to Castle Goring, where Sir Percy and Lady Burrell very kindly received them, and invited them to wander all over the house to see their very interesting collection of old china, foreign and English, old bronzes, nice bits of old furniture, and excellent pictures. Altogether it was a treat, and the writer was particularly struck with the way in which every piece of old china was set off to the best advantage,—not thrown together all higgledy piggledy, as is often the case; but whether in a cabinet, on a mantel-piece, or on the wall, everything was arranged with great taste.

The visitors next retired to a large tent in the grounds, where a capital dinner was provided, Sir Percy Burrell, in the chair. The usual toasts were proposed and responded to, and some capital speeches let off. A walk about the grounds, some coffee at the castle, and then all returned to their respective homes, well pleased with the day's excursion, although it was a damp one.

THE ESSEX ARCHÆOLOGICAL SOCIETY.

On July 30th, and for the first time since its formation, this society held its annual general meeting and excursion on the western borders of Essex, the starting-point being Bishop Stortford, where, at the railway station, the local committee had provided a number of wagonettes and other suitable conveyances for the members and visitors, some of whom came from Maldon, Colchester, and other distant parts of the county. The day was fine, and with the interesting programme that had been sketched out, an agreeable afternoon was spent. A pleasant drive past the Bishop Stortford Local Board farm, and by Latchmore Bank, brought the party to their first halting-place,—Great Hallingbury Church, where they were welcomed by Mr. John Archer Houblon and the Rev. H. M. Oswald, the rector. The party then went to Barrington Hall, the seat of Mr. George Alan Lowndes, one of the chief promoters of the excursion, passing as they did so through Mr. Houblon's park, and a large portion of the forest, well stocked with deer, which also belongs to his demesne. Luncheon was partaken of at the Hall, in a spacious marquee. We understand it is against the rules of the society to allow any gentleman whose estate may be visited by the society to provide luncheon, but at the special request of Sir H. J. Selwin-Ibbetson, bart., M.P., and Mr. Lowndes, they were permitted to furnish the entertainment on the present occasion. Mr. Lowndes presided.

After luncheon, a council meeting was held, followed by the general annual meeting, which took place in the hall of Mr. Lowndes's mansion, under the presidency of Mr. J. W. Perry Watlington. Mr. King, the secretary, read the report, which stated that the Council announced the continued prosperity of the society. The number of members, including fourteen honorary associates, was now 204, being, however, two less than at the close of the previous year. The financial statement shows a balance of 188*l.* 8*s.* in favour of the society.

The Rev. B. Lodge called attention to the mural paintings discovered in Copford Church.

Mr. Lowndes then read a paper on "The History of Hatfield Broad Oak."

It was announced that the next meeting of the society would be held at Romford. Some articles of antiquity were exhibited.

The company next proceeded to enjoy a quiet stroll across Mr. Lowndes's beautiful park to Hatfield town church, the chief features of which were pointed out and described by the Rev. O. W. Davys, rector of Wheathampstead, Herts. Some excavations had been made at the east end of this church, with the view of endeavouring to trace the foundations of the old priory church which formerly stood here, and the Rev. O. W. Davys now explained the objects and results of these investigations, and gave some very interesting information with reference to the leading features of the existing church. The old priory, which was built chiefly of timber, stood at the east end of the church.

When Hatfield Church had been thoroughly inspected,—the Rev. G. Burn was in attendance, giving information, and offering every facility for research,—the party walked to the conveyances, and the return journey was immediately commenced, time not allowing any further exploration. Bishop Stortford was safely reached in time for the train. The arrangements of the local committee were altogether good.

Cure of Echoes.—We shall be glad to hear of any further experiments in this direction by the use of wires.

WATER FOR WARWICK.

A good supply of pure water for Warwick is much needed. The present supply is obtained from the River Avon by pumping. The Avon, we must add (above the intake to the works), receives not only the sewage of Coventry, but of various towns and villages also.

A scheme is before the Town Council to supply water for this town by gravitation from the high lands of Haseley, some four miles distant, but some of the ratepayers oppose. At the last meeting of the Town Council, the engineer of the Haseley water scheme, Mr. E. Pritchard, C.E., reported that during the month ended the 31st ult., with a rainfall of only 0·89 in., 6,557,635 gallons of water had been registered as having passed over the lower sills of the brook, giving a daily average of 211,536 gallons. During the sixty-five days from the 8th of June to the 11th inst. inclusive, careful experiments had been made to ascertain the total available quantity of utilisable water, and the result was a daily average flow of 214,927 gallons. This result clearly and fully demonstrated the presence of spring water. Alderman Robins thought that these figures could not be too widely known. It was remarkable that, during a period when it had been repeatedly asserted the flow of the brook ceased altogether, there should be a daily average of 214,000 gallons.

It is to be hoped that vigorous steps will at once be taken to ensure the desired result.

SOCIETY OF ENGINEERS.

We are now at about the culmination of the season in which engineering societies have their meetings peripatetic and *al fresco*. On Tuesday in last week a large party of the members of the Society of Engineers and their friends, under the guidance of Mr. Perry F. Nursey, their active secretary, paid a visit of inspection, by permission of the proprietor, to the extensive rope manufactory of Mr. F. D. Frost, at Shadwell. Thence they proceeded to the Victoria Docks, and inspected the fine vessel of the English Channel Steamship Company, *Castalia*, just built from the designs of Capt. W. Dicey. The visit in each case excited lively interest, and imparted much pleasure to the party. A number of the members and Associates, and their friends, afterwards dined together at the Terminus Hotel, Cannon-street.

THE PEABODY BUILDINGS IN BERMONDSEY.

About three years ago the Peabody Trustees commenced the erection of several blocks of buildings for the industrial classes, similar in character to those which have been erected in Blackfriars-road, and other parts of the metropolis. When the buildings had been carried up to about half their intended height the works were suddenly suspended, and they have since remained in their unfinished condition. We understand that the stoppage of the works is owing to some dispute with the local authorities respecting a line of thoroughfare immediately adjacent to the site on which the buildings stand. East-lane, whereon the premises are being erected, is one of the worst parts of Bermondsey, and where houses for the working classes of a better sort, than those now existing, are much wanted.

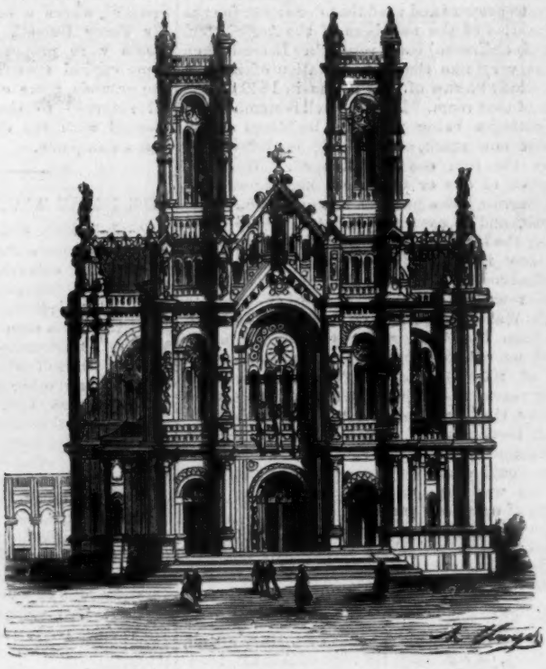
A CLOTHIER'S WAREHOUSE IN BRISTOL.

Few things in Bristol surprised the members of the recent archæological congress more than the improvement evident in the streets. No building is now erected there without some attempt at architectural effect. We have before now given illustrations of this in the shape of banks, insurance offices, and shops. The building, of which we give a view in our present number, is a warehouse in Quay-street, Bristol, in course of erection for Messrs. D. H. Walsh & Co., wholesale clothiers. It is built upon the site of an ancient dock, which formerly abutted upon the city walls. In the excavations quantities of planking and piling were cut through, the whole of which was covered with a deposit of mud by the tides of the Avon, which at one time appears to have passed over the site. The foundations were therefore unusually difficult. The site contains an area of nearly 200 square yards, and the warehouse consists of five floors and a cellar, with two main staircases, one of which is fireproof. The floors

COMPETITION DESIGNS FOR THE CHURCH OF THE SACRED HEART,

*Intended to be built at Montmartre, Paris.**

By M. Crépinet.



By M. Magne.

By M. Douillard.

By M. Devrèse.

[*See p. 705, *ante*.]

are supported by cast iron X columns, and Belgian rolled girders. The columns are upon a series of wedges, so arranged that the whole of them may be lowered in order that the floors be kept level, it being anticipated that unequal settlements may take place in consequence of the variable nature of the foundations.

The materials used in construction are bricks, red and white, with Bath stone dressings. The doorway is of red Mansfield stone, and the base course Stapleton grey sandstone. The roofs are covered with slate. As a portion of this warehouse is used by workpeople, special care has been taken to ensure proper ventilation. This has been done by the erection at the back of the staircase of a rarifying shaft 5 ft. square. Through the centre is erected a cast-iron chimney, 50 ft. long and 18 in. diameter, into which the smoke of the hot-water circulating boiler and the goose stoves is conveyed. This shaft is arranged so as to be capable of removing about 2,000 cubic feet of air per minute from the various rooms. The building is warmed throughout by hot-water circulation. There is a powerful hydraulic hoist, by Tannet, Walker, & Co., of Leeds, which extends to all the floors, worked by the Bristol Waterworks' water, at a constant pressure of about 80 lb. to the inch. The cost of this building is expected to be about 5d. per foot cube, and every part is understood to be of the most substantial character. Mr. Henry Masters, Park-street, Bristol, is the architect.

A CLOTHIER'S WAREHOUSE, QUAY STREET, BRISTOL.—Mr. Henry Masters, Architect.

PREHISTORIC BRISTOL.

This was the title of a paper read by Mr. Kerslake at the second evening meeting during the recent archæological congress in Bristol.

Mr. Kerslake said:—Among the unwritten vouchers of the facts of long-past ages, the dedications of our churches all over the land seem to have been unduly disregarded. Every one of them is a tradition, and more; it is a tradition attested by a substantial monument, and the circumscribed area of the subject parish confines its testimony to an indisputable locality not so certainly determined even by written records. Not long since our city government had resolved to demolish the central church of St. Werburgh in order to increase the accommodation at an ill-chosen omnibus station. This gave occasion to remind them that this church is a standing visible witness that Bristol was several centuries older than it had been allowed to be by an influential and much-read historian. What with the detractive scepticism of historical unitists and the destructive zeal of our Conservative corporation, ancient Bristol,—both name and thing,—is in imminent peril of being sponged off from the face of the earth. It is much to be regretted that, among the standing committees of the town councils of ancient cities, there should not be one for archæology. This dedication of St. Werburgh proved that the town in the midst of which it stood must have already existed whilst Mercia was yet an independent kingdom, bounded on the south by our river Avon—St. Werburgh having been daughter of a king of that people. But the name of another Bristol dedication is still remembered, although the church itself had long undergone the fate from which it was hoped St. Werburgh had been permanently respited. By an independent side-by-side testimony this dedication not only endorses that of St. Werburgh throughout its whole extent, but beyond that will, it is thought, be found to carry back to a still earlier date the civilised occupation of the adjoining spot to which its name still adheres. This was the church of St. Ewen, which also stood formerly in the very centre of the city, at one corner of the four crossways, but the site of which is now covered by the council-house. Remarking that there formerly was at Gloucester and at Hereford a church dedicated in the name of St. Owen, the reader observed that all three,—Bristol, Gloucester, and Hereford,—had the same patron saint, "St. Ewen," being merely a local orthographical variation, the cartular form, "Audoenus," being common to the three. All the authors, proceeded Mr. Kerslake, who have hitherto attempted to appropriate the name to the saint commemorated have fixed it upon St. Ouen, Archbishop of Rouen, who died A.D. 683. It is believed, however, that a closer view of the question will make it more likely to have been a saint who lived and died in Britain at an earlier age. Indeed it deserves particular notice that, although this dedication is so uncommon in England proper that it is believed only one example besides these is known, yet that these three should be found together like a string of beads one in each of the three chief English cities along the Welsh frontier. This will become still more remarkable by the addition of a fourth link to the chain, not so well known as the other three. Just within the mouth of the Wye, on the left or English shore, at the southern extremity of Offa's Dyke, at Beachley, is an ancient small landing-place, called in the Ordnance Survey "Hewan's Rock." The late Mr. Ormerod, however, who lived on the spot, called it "Ewen's Rock," and quotes an inquiry by a court of survey in 1651, after the course of an ancient way which led up from it. It is thought, at any rate, that this little obsolete ferry station on the Welsh frontier cannot have had a Norman name. It was probably a landing-place for Welsh pilgrims towards shrines left behind them in their lost country. All this seems to make it likely that any search after the home of the person whose name remains with us would have the best chance if we should turn for it towards Wales. In fact, we have on British ground ample materials to account for the name without fetching a pretender to it out of Neustria or Normandy. In Cornwall, for instance, there are two dedications of St. Uny or Euny, found also written "Ewinus." But among the Cambrian Britons are several who might put in a claim. Among the earliest British Christians was Owain, the grandson of Caractacus, who is recorded to have been a strenuous protector of the new faith. Then, again, later, there was the famous Owain, the son of Maximus. He was not only reputed a saint, but was said to have been the earliest independent sovereign of Britain at the retreat of the Romans. His claim to these memorials of his name along this particular frontier derives a considerable amount of local probability from his having become the ancestor of the succeeding Princes of Gwent. But the person with whom we are here more likely to be concerned was St. Howyn or Hywyn, whose name is preserved in the dedication of the church at Aberdaron, situated at the most western point of Carnarvonshire. This last-mentioned personage is said to have been one of a large company of refugee saints who returned from Armorica to insular Britain with Saint Cadvan, A.D. 516. He first joined the famous congregation at Llantwit Major, Glamorgan, and afterwards retired to Bardsey, where he is said by some authors to have been a bishop. The Saint Howyn whom it has, therefore, been ventured to adopt as the parent of our dedication, is said to have died in the first half of the sixth century, so that his memory must have been still fresh, and his veneration probably at its highest point towards the end of that century, when the English conquest of the Severn Valley from the Britons was made, which has been so learnedly and ingeniously mapped by Dr. Guest. But that distinguished and lucid topographical interpreter of history has left it quite open to us to think that the Wye instead of the Severn then became the practical western boundary of the Anglo-Saxon people, and that then, or soon after, the string of Welsh dedications at Hereford, Gloucester, and Bristol may have been instituted; at any rate, their continuance thus intimately associated down to our own times may be accepted as a substantial witness of a very curious fact that, after the conquest of this district, there was what may be called a commercial colony of the Welsh nation, tolerated or established at each of the English frontier cities. There is another example of the dedication, St. Owen at Dublin, and, unlike our three English ones, the Dublin church is only partly demolished. This Irish dedication has been sometimes thought to be a later graft of our own St. Ewen, caused by the intimate intercourse that has existed in all ages between Bristol and Dublin. The expedition of Strongbow was planned and contracted, and probably largely recruited, at Bristol. There is also a St. Werburgh at Dublin. But a glance at the names of the churches contained within that part of the old city lying south of the Liffey, which is said to have been occupied by the English adventurers, shows almost a reproduction of those of Bristol itself. This distant St. Owen, as well as St. Werburgh, seems to be thus fully accounted for: which is our only concern with this very curious overflow of the materials of our inquiry. It seems, however, to indicate that the emigrants gathered themselves again into their own reconstituted parishes, so that those who had been neighbours in their old homes should continue so in their new one. The reader went on to observe that although the name of the saint was so lately as the fifteenth century still celebrated by the poets as one of the brightest in the Bardsey constellation, it was almost as scarce in the dedications over the Cambrian area as it had been found east of our border galaxy in England, and, by means of a particular description of the peculiarities of the Cambrian hagiological system, and the later Catholic influence upon it, he suggested that any of St. Howyn's dedications which may have been scattered beyond the conserving influence of his local memory had been absorbed among those known as St. John the Baptist and St. John the Evangelist. He argued that the existence of this dedication amongst us proved that Bristol not only had a continued existence from, probably, the end of the sixth century to certainly the beginning of the tenth, but also during that early existence, it held a very important standing as a centre of intercourse between different races and different nations. In common with Hereford, Gloucester, and Exeter, Bristol had within it a distinct relique of a remarkable municipal social condition which only existed during that period.

But then we were told that the name of Bristol was not found in any written records before the year 1051. So much the worse for the records. The preservation of such documents before that time has been very fortuitous and is very scattered. Such, however, as have come down to us have chiefly owed their survival to there having been the title-deeds or annals of religious congregations. If Bristol, instead of an independent secular commercial port, had been an appendage to an Anglo-Saxon monastery its name might have come down to us in some cartulary. This has been the luck of some places only known to us as pleasant summer evening walks, such as Penpole, and, perhaps, Combe Dingle, which are mentioned by name as early as the ninth century. In conclusion, Mr. Kerslake argued that the name of the adjacent village of Brislington contained in its structure unmistakable evidence that it belonged to one of the very earliest showers of Teutonic place names that fell upon this island, and yet that in it the name of Bristol was visibly reflected as pre-existent. When this ancient name Brislington was first used, Bristol, he said, not only already existed, but had an offshoot to which it then stood godfather. Rome was not built in a day, neither was Bristol a sudden growth of yesterday.

PROPOSED NEW DOCKS AT MILFORD.

The project for making Milford a port for large sea-going ships is now being actively prosecuted. It is proposed by a company, established for the purpose, to construct a large dock having an area of about forty acres, together with quays, wharfs, warehouses, landing-stages, coal-tips, and railway sidings. It will, therefore, be seen that the contemplated works will be on a large scale, and, as a considerable depth of water is assured, it is stated that there will be every facility for the arrival and departure of the large American and other steamers now trading between Liverpool, London, Glasgow, and foreign ports. The proposal also includes the construction of two large graving-docks, one of which will be sufficiently spacious to admit the *Great Eastern* steam-ship, which has hitherto not been able to enter any dock in the country for the purposes of repair. There will also be a smaller dock, and a patent slip. The site of the proposed docks is to be acquired by closing an inlet of the sea at Milford. Provided Milford can be established as a port of departure for large foreign-going vessels, the Great Western Railway Company would doubtless be greatly benefited, and we, therefore, find that the directors of that company have shown their confidence in the project by subscribing to the amount of 50,000*l.* in shares, out of the sum of 250,000*l.*, which is the proposed capital of the company. It is also stated that the support of several of the largest steam-ship companies of London and Liverpool have been promised, and it is asserted that if the several companies now coaling at Southampton were to take their coal on board at Milford, being in close proximity to the South Wales coal-fields, the saving would be so large as to enable them greatly to increase their dividends. The promoters further make the remarkable statement that the proposed docks will not cost more than one-tenth the price of the cheapest docks in England. The probability, however, is that this is taking a too sanguine view of the undertaking.

METROPOLITAN HOUSE-BUILDING STATISTICS FOR 1873.

Colonel Henderson, the Chief Commissioner of Police for the Metropolitan District, has just issued his report for 1873, and in reference to the building of new houses and street improvements within the metropolitan area, the report furnishes some interesting particulars. As regards new dwellings Colonel Henderson states that the number of new houses built during the year was 7,687, which he shows, by comparison, was considerably less than the number erected in 1872, as in the last-named year no less than 11,179 new houses were built. Concurrently with this increase of new dwellings, and a consequent increase of population, the Chief Commissioner states that during the year new police stations were built and opened at North Woolwich, Harrow-on-the-hill, Enfield, Putney, Heston, Chislehurst, South Norwood, and R dney-road, Newington; and as regards this portion of his report he remarks that the constant increase of houses and population is mainly in the suburban districts, which brings corresponding demands for additional stations and police assistance. He adds that the new streets and squares opened and places in charge of the police during the year, were 154 in number, and with one square covered 26 miles and 890 yards. This, he observes, is an increase on the previous year, when only 20 miles of new streets were opened; but on the other hand, he states that it is much below

the average of former years. With reference to fires, and the damage done by them to houses and other buildings and property, he says that during the year the police attended 573 fires, and that a total of 14,789 men were employed, some of them, as at the Pantechnicon, for several consecutive days. Adverting to the Metropolitan and City Police Orphanage, the Colonel reports that a suitable building for it has been purchased at Twickenham, which is in course of being adapted as a permanent orphanage. A prominent feature in the report is the condition of common lodging-houses in the district. On this point the Commissioner, amongst other things, states, that during the past year 665 keepers of common lodging-houses had been served with notices to register their houses, and that 243 of these houses had been surveyed and measured to accommodate (if registered) 4,960 persons. A very large majority of these houses might, with comparatively small outlay, be rendered fit for registration, and 182 houses had been permanently registered, the accommodation provided in these houses being for 3,650 persons.

TO HEPHÆSTOS.

—*Iliados* Σ.

Smite the steel, O Smith!
Smite the steel till the senses reel
At the force of thy blows, O Smith!

Smite the steel, O Smith!
Till the sparks that fly shall dazzle the eye
In thy grimy cave, O Smith!

Weld the steel, O Smith!
Weld the steel for woe or for weal
As God above shall will, O Smith!

Weld the steel, O Smith!
Into helmet, and greave, and shield,
Fit for a mighty man to wield.

Forge the steel, O Smith!
Till the temper'd blade take its azure shade,
And the victor's sword is made.

Forge the steel, O Smith!
Till it may be sold for its weight in gold,
Tough as valiant hearts of old.

Grave the steel, O Smith!
The burnish'd bright, with pictures dight,
To stimulate heroic fight.

Grave the steel, O Smith!
And figure it o'er in cunning device:
Artist work beyond all price.

A. H.

THE NEW WAVERLEY STATION OF THE NORTH BRITISH RAILWAY.

The extensive new station of the North British Railway at Edinburgh, called the Waverley terminus, which covers an area of between eight and nine acres, is now almost entirely completed, and ready for opening. The works include the erection of the new Waverley Bridge, as a necessary part of the station reconstruction. This bridge, which is a very fine work, and an important public improvement, is 110 ft. wide, and is laid on five lattice girders with transoms between. The bridge provides a very useful additional communication between the Old and New Towns of Edinburgh. It has just been completed, and handed over to the Lord Provost and Town Council, by whom it will be maintained. The quantities of iron used in its construction consist of 484 tons in the main girders, 272 tons in the upper and lower transoms, 177 tons in the cast-iron columns and pilasters, and 105 tons in miscellaneous wrought-iron work, making a total of upwards of 1,000 tons of iron used in the erection of the structure.

The station encloses an area of upwards of 1,000 ft. in length by 360 ft. in width, and contains twelve lines of rails, three wide platforms, a footway, and a carriage entrance to the station, with cabstands, and at the foot of the approach blocks of new buildings, appropriated on the ground-floor to a large booking-hall, waiting and refreshment rooms, rooms for lost and left luggage, and other accommodation required by the train service. The upper portions of the building provide accommodation for the general manager and his staff, and the secretary, accountant, engineer, and other chief officers, and their respective staffs. The station is situated between the North Bridge and the new Waverley Bridge, and the whole of the area between these bridges will be covered in, the roofs being almost entirely of glass and iron. The roof is constructed on the lattice-girder principle, and dispenses with columns for support. The crown has transverse roofs, rising 2 ft. 8 in., supported by the lattice-girders and ties, and having wrought-iron gutters between each cross-roof. The main girders are 10 ft. apart, and purlines are carried along the whole length as binders at the tops and at the feet of the rafters. In addition to the platforms and station accommodation above referred to, there are rails with side and end platforms, to the east of the North Bridge, for the traffic to Granton, Leith, Fife, and the north; whilst on the west side of the new Waverley Bridge there are also lines and platforms for the local traffic. The short-traffic platforms will also be roofed, and the continuous covered platforms will be upwards of 1,100 ft. in length, together with another short traffic platform on the east side of the booking-offices, 450 ft. long. The twelve lines in the central portion of the station converge to two lines at the mouth of the Mound Tunnel on the west, and to two lines at a point about as far distant from the North Bridge on the east as the Mound Tunnel is from the Waverley Bridge.

The south side of the station is devoted to goods traffic, and will have, in addition to abundant dock and shunting accommodation, four goods sheds, each having an office attached to it. The dimensions of the sheds are two of 150 ft. by 30 ft., one 180 ft. by 30 ft., and one 180 ft. by 20 ft. The works have been designed by Mr. Bell, the engineer of the company, and are being carried out by the company's workmen, under the superintendence of Mr. Bell, and his assistant, Mr. Learmont.

REMOVAL OF THE DOUBLE TRAMWAY LINES IN CAMBERWELL.

The double lines of tramway in several of the narrow portions of the thoroughfares in Camberwell and Peckham having been found to be an inconvenience, as well as an injury to tradesmen and shopkeepers, the Tramway Company have been engaged during the last two or three weeks in removing the double line at various points, and substituting for them a single line in the centre of the road, with sidings to admit of the tramway-cars, travelling in opposite directions, to meet and pass each other.

In making these constructive alterations, the Tramway Company state that whilst they have done so in deference to the wishes of the tradesmen in the locality, who alleged that their business was prejudicially affected by the double line, the consequence will be unavoidable detentions in the traffic which have not hitherto been experienced.

MUSIC BY TELEGRAPH.

About two months ago, says an American paper, Mr. Elisha Gray, of Chicago, a gentleman well known in the electric telegraph world as a maker and inventor of some of the most valuable instruments now in use, conceived an idea which would be an extraordinary development of telegraphic science if he could only succeed in practically demonstrating it. Short as has been the lapse of time since he first began his experiments, he has succeeded, almost beyond his own anticipations, in perfecting an instrument which will convey sound by electricity over an unbroken current of extraordinary length,—that is, without the aid of automatic repeaters. In the ordinary transmission of messages over the telegraph wires to points at long distances, a message is generally repeated by automatic working instruments about every 500 miles, in order to renew the current of electricity. Mr. Gray has already transmitted sounds, which are distinctly audible at the receiving-point over an unbroken circuit of 2,400 miles. This is, more properly speaking, a discovery,—not an invention. The invention merely consists in adapting certain appliances to the discovery, for the purposes of its practical illustration. Iti s one of the greatest discoveries made since the early days of Morse. Such noted electricians as Mr. George Prescott say this discovery of Mr. Gray only goes to prove, what all electricians have long agreed upon, that we know little at present of the possibilities of the future of electric science. Mr. Chandler says that he regards it as the first step towards doing away with manipulating instruments altogether, and that he believes that in time the operators will transmit the sound of their own voice over the wires, and talk with one another instead of telegraphing. The writer has seen this novel instrument at work, and has heard music played on a small melodeon, or piano key-board transmitted through an unbroken circuit of 2,400 miles, and reproduced on a violin attached to the receiving end of the wire. Mr. Gray played "Hail, Columbia!" "The Star-spangled Banner," "God save the Queen," "Yankee Doodle," and other well-known airs, and they were unmistakably repeated, note for note, on the violin, which lay on a table near at hand. Even an accidental false note was immediately detected on the violin. Mr. Gray exhibited many other experiments with tin cans, small paper drums, &c., which were attached to the receiving end of the wire in the place of the violin. The paper drum gave the musical sounds just that peculiar buzzing twang which is produced by boys placing a piece of thin paper over a hair comb and then blowing on it. What this will all lead to, or where it will all end, is one of the most extraordinary problems of the day. The apparatus by means of which the extraordinary feat in telegraphy is accomplished, has been named by Mr. Gray the telephone, or an instrument designed for the purpose of transmitting sound to a distance. It consists of three general parts; first, the transmitting instrument; second, the conducting wire, running to a distant point; and third, the apparatus for receiving the sound at that distant point. The transmitting apparatus consists of a key-board having a number of electro-magnets corresponding with the number of keys on the board, to which are attached vibrating tongues or reeds, tuned to a musical scale. Any one of these tongues can be separately set in motion by depressing the key corresponding to it. Thus a tune may be played by manipulating the keys in the same way as those of an ordinary piano or melodeon. The music, produced entirely by electricity, of these notes is so distinctly audible in the next room that, in spite of much talking, there is no difficulty in determining what tune the manipulator is playing. To this transmitting instrument the conducting wire is attached, the other end being attached to the receiving apparatus, which may be anything that is sonorous so long as it is in some degree a conductor of electricity. A violin with a thin strip of metal stretched between the strings at a point where the bridge of the instrument is ordinarily placed, will, on receiving the sound transmitted through the conducting wire from the piano, give out a tone very similar in quality to that of a violin. If then the metallic strip is electrically connected with a wire, say 500 or 1,000 miles long, which has its distant end properly connected with the transmitting instrument, any one at the receiving end can distinctly hear, without the aid of electro-magnetism, the tune or air which is being played 500 or 1,000 miles away from him, if he properly manipulate the receiving apparatus. The length of the wire connecting the transmitting with the receiving apparatus may be one mile or 10,000 miles, provided that the isolation is sufficiently good to prevent the escape of the electric current before it reaches its destination. In fact, there seems no limit to the distance to which sound, of any desired pitch, may be thus conveyed with from two to five cells of battery, all the conditions being proper. The quality or timbre of the tones depends upon the character of the receiving apparatus, which may be a violin prepared as described above, a tin hoop, with foil paper heads stretched over it, after the fashion of a baby's rattle, a nickel five-cent piece, an old oyster-can, and a thousand other things. A sound, sufficiently loud to read Morse telegraphic characters, made by interrupting, with the common telegraphic key, one sustained note, has been obtained, under favourable circumstances, at the receiving end of the wire without any more scientific sounding apparatus than that of a piece of common tissue paper. Aside from the intense interest which this discovery will naturally excite in the scientific world,—as to the causes which produce this extraordinary electro-physiological phenomenon, and the gratification it will afford to all lovers of the marvellous,—it is evident that, although the practical uses to which it may be put cannot as yet be recited, quite enough has been demonstrated to show that, from its basis, a new system of telegraphy, both for aërial and submarine lines, of a simple, rapid, and economical character, can be introduced. Mr. Gray has applied for patents of his invention in this country and in all the countries of Europe.

THE CONDITION OF THE BATTERSEA CEMETERY.

In a recent number of the *Builder* we referred to the unsatisfactory state of Battersea Cemetery, as being dangerous to the health of the inhabitants of the district, in consequence of there being common graves kept open in immediate proximity to houses. These facts, which were stated in a report presented by Dr. Oakman, the medical officer for Wandsworth, caused an inquiry to be made by Dr. Holland, the Government inspector, who, after hearing evidence, expressed an opinion to the effect that these open graves were in violation of the Act of Parliament; and he added, that in future the Burial Board would have to comply strictly with the Act. He also stated that, from evidence which had been laid before him, it was manifest that the cemetery could not much longer be available for funerals, as it was already almost full.

PLYMOUTH GUILDHALL OPENING.

The grand ceremonial of the opening of the Guildhall and Municipal Buildings at Plymouth on the 14th inst., by the Prince of Wales, was a thing to be remembered by the townsmen and visitors. It was a great success in all respects, and the reception of the Prince must have highly gratified him. On the day following the opening nearly 2,000 Freemasons in full costume received their Royal Brother. The chief decorations and illuminations were entrusted to Messrs. Defries, by the Reception Committee. The designs were specially prepared for the occasion, and were, to a certain extent, novel.

The decoration and illumination of the clock tower were the chief feature; the decoration consisted of Venetian masts covered with blue cloth, and gilt fluted columns, and surmounted by gilt Royal crowns and faced with shields representing the arms of the borough and Prince of Wales plumes. From the Venetian masts to the clock tower were carried festoons of flags and floral decorations, and at the angles were placed specimens of statuary. The railway arch was decorated with care, upwards of thirty trophies, representing the arms of the borough and Prince of Wales being displayed together with hangings of drapery. The Club House was also decorated and illuminated by Messrs. Defries. Throughout the line of route, the Prince of Wales's crystal plumes (illuminated at night), and trophies of flags, shields, ribbons, and mottos were introduced on all the lamp-columns and Venetian masts as on the occasion of the Royal visit to the City of London on Thanksgiving Day.

We have already described the buildings and given a view of them. The architects, as we have said, are Messrs. Norman & Hine, of Plymouth; and the contractors, Messrs. Call & Pethick, also of Plymouth. Mr. Samuel Roach executed all the Portland and limestone dressings and slating, which amounted to nearly a third of the contract sum. The ironwork and plumbing were executed by Mr. P. J. Marshall, the plastering was by Mr. A. Lethbridge, painting by Mr. S. Thomas, sculpture by Mr. Trevenen and Mr. Boulton, of Cheltenham; capitals by Mr. H. Hems, of Exeter. Among the sub-contractors there were also Messrs. Freeman & Co., of Penryn, for granite; Mr. Wells, for gas-fitting in the north block. The whole of the fittings in the offices were made in Plymouth; those of the council-chamber by Thomason, Birmingham; Mr. Whipple, gas-fitting in the south block; the coronæ and other fittings being made by Skidmore & Co., and Richards, of Coventry; Mr. Thomas, Stonehouse, subcontracted for painting and glazing; Mr. Fouracre, Stonehouse, as decorator. Various fittings have likewise been supplied by Messrs. Stephenson, Brothers; Plimsaul, Brothers; Arnold & Co.; and other firms. The artists in stained glass have been Messrs. Heaton, Butler, & Baynes for the windows in the council-chamber and the Moore window; Messrs. Fouracre & Watson, Stonehouse, for the windows generally in the large hall, with the Priory and Pilgrim windows, the Mayors' memorial windows, and others elsewhere.

The building contains 20,000 cubic yards of masonry; 20,000 cubic feet of granite, in plinths and steps; 60,000 cubic feet of Portland and limestone, in door and window dressings, arches, and copings (executed by Mr. Roach); and 52,000 superficial feet of slating with Delabole and Bangor slate, in bands, nailed with copper nails.

The walls of the Guildhall are built of dark limestone, relieved by bands and quoins of light and red limestone; the plinths are of granite, and the chief dressings of Portland stone. The roofs are in bands of different coloured slate; and a similar chromatic effect has been produced in the tops of the Westwell-street angle towers, which are of wood, slated. Red Mansfield stone has been used in the large windows and elsewhere, but sparingly. The enclosing walls of the Guildhall-square terminate in columns, with shafts of polished red granite from Aberdeen, surmounted by carved capitals of Portland stone. The interior woodwork is almost throughout of pitch pine varnished, the jambs and lintels of the doorways being ornamented by quatrefoils of ebony. The council chamber and the whole of the municipal offices are furnished, chiefly in oak or pitch pine, from the designs and working drawings of the architects.

PORTLAND CEMENT.

Sir,—Will any of your correspondents assist me with (1) directions for using Portland cement for stucco and plastering purposes generally, proportions of sand, &c.; (2) for building in brickwork; (3) for concrete building?

J. C.

THE LONDON FOREMEN ENGINEERS AT MR. PENN'S.

On Saturday last, the members of the London Association of Foremen Engineers and Draughtsmen, with their families and friends, held their annual summer festival in the grounds of Mr. John Penn, C.E., F.R.S., of "The Cedars," Lee, Kent, kindly opened to them for the occasion. Mr. Joseph Newton, lately attached to the Royal Mint, the president of the Association, was managing director of the party.

Mr. Penn's gardens and pleasure-grounds are very charming, from the profusion they present of the wild flowers of the woods and fields; their fine collections of cultivated flowers and shrubs in great variety; the grassy undulations; and especially from the perfect forms and full maturity of the forest-trees of divers kinds with which the park is adorned. It is somewhat detrimental to the charms of the demesne that it is twice intersected longitudinally by Belmont-hill-road, for the diversion of which we believe Mr. Penn obtained an Act of Parliament, and by the North Kent Railway; and laterally by "the lover's lane," a public footpath which separates the kitchen from the flower garden. The finest portions of the grounds, containing the venerable cedars, from which the park is named, are those immediately adjacent to Mr. Penn's mansion. The foremen engineers and their friends had unrestrained access to all parts of the estate.

The invitations were for three o'clock, and from that hour until about four the visitors continued to arrive, till upwards of 200 had assembled. A band of music, furnished by mechanical engineers from Messrs. Maudslay & Co.'s works, and ably led by Mr. Astell, had been engaged for the occasion, and by their excellent performances did much to enhance the pleasures of the party. A large marquee was provided near the Rose-garden, in which, about four o'clock, the members and their friends, who included a number of ladies, sat down to a cold collation. Mr. Newton, the president, explained that the original intention had been to hold their festival at the Alexandra Palace, but that, for some reason, had been found impracticable, and in their difficulty they had applied to one of their oldest, ablest, and best friends, Mr. John Penn, who had promptly and kindly placed his beautiful grounds at the disposal of the committee. As engineers, they must all feel proud that this beautiful estate had been honourably acquired by the three generations of Penns, of whom the first had passed away,—men who with their associates in the firm were a glory and an honour to the engineering profession. He concluded by asking the company to join with him in wishing "Health, happiness, and prosperity to Mr. John Penn, his family, and firm."

Mr. John Penn, jun., replied for his father, the family, and the firm, to whom he would gladly report the kind wishes that had been expressed concerning them. As for his father, he had been quite glad when he was asked to receive the members of the London Association of Foremen Engineers and Draughtsmen, with their families and friends; and there was probably no company to which his father would give a more hearty welcome than the large and respectable assembly he had the honour of addressing. Mr. Penn was much applauded during the course of his address.

The officers of the Association present included, Messrs. Newton, president; D. Walker, secretary; Jones, treasurer; Gibbons, vice-president; and the Rev. Mr. Solly, chaplain. The members of the society present, and friends, included, among others, managers and principal foremen from Messrs. John Penn & Sons', Messrs. Maudslay & Co.'s, Messrs. Humphreys & Sons', Messrs. J. & J. Rennie's, Messrs. Hedley's, with a large number of foremen and draughtsmen from the north bank of the Thames, Woolwich, and, in a word, from the principal engineering establishments in or near London.

BOATS AT THE THAMES PIERS.

We are glad to see that the self-sacrifice of the late Mr. C. Emery, an artist, who lost his life in endeavouring to save another from drowning, is not forgotten, a subscription being now proposed in his memory. When an accident of this kind happens, there seldom is a boat ready for the emergency. How strange it is that amid so much philanthropy, in the matter of accidents on the river no reform or improvement seems to be attempted. As far back as eight-and-twenty years ago, when old Westminster Bridge was in existence, we remember a similar event. A boy playing on the timbers at Gladdish's Wharf fell overboard, and Mr. John Bate, being at the time on board the *London Pride* steamer, jumped from her into the stream without stopping to take off any of his clothes, and swam to the rescue. The current, however, was too strong to enable him to reach the boy in time to save him, who sank within a yard of his pursuer. Almost exhausted, the latter found, on looking round, that no assistance was at hand, and he had, therefore, to swim for his own life across the strong current to reach the only part of the shore not occupied by coal-barges. The steamer could not wait; the boat at the pier was without paddles, and chained,—which appears to be the rule. All the thanks Mr. Bate received were of a negative kind. The coroner's jury even were unaware that any attempt had been made, and the bystanders on the bridge appeared to think it was sport! Now that improved piers are erected, a handy boat should always be in readiness,—not chained or fastened so that no one can use her, but for the piermen to cast off and use as part of their duty, to be performed with the utmost alacrity.

"LITTLE FISH ARE SWEET."

Under this head a correspondent writes as follows, and a second correspondent sends us a letter to precisely the same effect:—"Sir: An eminent London architect came from Manchester to Cambridge to make a survey of St. Edward's Church as to the restoration of the east wall of the north aisle and a new vestry: the sum to be expended is about 180*l*. (Cambridge possesses only nine local architects). A period of three weeks must elapse before he can give it his attention." It is not our province to dictate to architects, eminent or otherwise, what works they shall undertake and what refuse. Our correspondents, moreover, should recollect that clients have to be considered. If an architect refuse his assistance to a client in respect of a small matter, the aforesaid client is very likely to apply elsewhere when he needs aid in a large one.

ART MUST BE STUDIED.

With reference to the view, recently published by you, of a building now in progress, I cannot restrain myself from saying that engineers are not necessarily architects.

If art were an unimportant matter, we need not waste words about it, but it is not so. Again, without artists we shall never have art, and the sooner intelligent men study its realities the better it will be for us as a nation. We cannot trifle with it and yet retain our position in the world as a great or important people. Science and art may be said to be the opposite but yet connected poles of thought, the one depending upon the other, and unable to exist alone. One great use of art is to preserve the true balance of humility, of which every really great man has

much, and science also repays the obligation by levying the same tax. But when science, or its counterfeit, arrogates to itself a knowledge of the mysteries and sublimities of art, to which its nature is alien, then arise wide-spread discord and disaster, which, if left unchecked and unrebuked, must ultimately bring upon us national disgrace. The root of the evil lies in ignorance partly, but mostly in false and foolish pride. Get the axe well to work here, and we may hope for better things yet. The people have become rich, and this puzzling question of taste in matters of art is more trouble to them than ever; but if they will be wealthy, they must be wise also, and true wisdom ever looks it fully in the face, and does not shrink from facts.

If, however, we treat the whole affair as a good sort of joke merely, then all that can be written on art, though the pens were from angels' wings, must remain as so much waste paper.

VERITAS.

"WAKING THE DEAD AND KILLING THE LIVING."

THE editor of the *Irish Builder* makes obliging reference to some accounts given by us under this heading years ago of the evils produced by the custom of holding wakes,* and describes several abominable occurrences in connexion with wakes which show only too strikingly the necessity for further efforts to repress the unwholesome and most injurious practice. In one case about twenty-five persons had assembled in the drawing-room, and were merry-making, dancing and singing, according to the usual custom, when at about half-past ten o'clock the floor suddenly gave way, and the entire company as well as the furniture of the room, were tumbled to the basement story. The child's remains were recovered from the *débris*, and carried to an adjoining house, the lid of the coffin in which they were placed being broken by the fall. But few of those present at the wake escaped without more or less of injury—several were conveyed to Jervis-street Hospital, where one of them, a Mrs. Wade, died on Wednesday. The writer says, "Are our countrymen and women so utterly lost to shame as to look with complacency on such wild proceedings? Is it Christian? is it Catholic or human that the room of death should be continually dedicated to such abominable carnivals of indecency and brutality? Cannot a Roman Catholic Cardinal Archbishop exercise his influence in putting down such infamies. On the score of health, if not on that of decency, the practice calls for abolition. We have known the only two rooms of an Irish cottage to be crammed chokefull of mourners,—merry-makers, rather,—the floors being the principal sitting accommodation for the majority, and even the bedside of the corpse being utilised by sitters. Bad whiskey, bad tobacco, bad manners, and bad air, being everywhere, the young children imbibing too readily the examples set before them by their parents or neighbours for future imitation. The seeds of disease are often contracted at wakes, and the sight has often been the stepping-stone or starting-point for young females to headlong immorality, the streets, and an early grave."

THE CITY WATER SUPPLY.

A REPORT has been issued to the members of the Common Council, by the Gas and Water Committee of that body, in answer to the question "whether any improvement can be suggested in the supply of water to the City of London in case of fire," and some other points referred to them. The report, after furnishing a statement of past legislation, refers to the present condition of the water supply of the City, which is received almost entirely from the New River Company. The company have now provision for a continuous daily delivery of more than 36,000,000 gallons, with a present daily demand of about 25,000,000 gallons; they also have a right to pump to any extent from the river Thames, below Blackfriars, for any service of a "non-domestic" kind, and can store about 150,000,000 gallons, all available for use in the City, where they have 78 miles of pipes, 25 miles of which are constantly under pressure. With regard to the water-supply required for the extinction of fire, Captain Shaw reported, that in the whole of the metropolis it had not been much in excess of 8,000,000 gallons, and that there had been no difficulty from any insufficiency of water-supply in the City, whatever occasional delay there might have been in obtaining the service. The committee are of opinion that the system of street-plugs and turncocks is not suitable to meet the sudden emergencies in cases of fire, and that it is absolutely essential for the protection of public property that a proper number of hydrants be fixed. The committee think it highly desirable that the Corporation should take the lead in establishing a system which there could be no doubt would be a most useful adjunct in preventing the extension of fires. If the court agreed with this, the committee asked that the report should be referred back to them to consider the means of carrying it out.

* Afterwards printed in "Another Blow for Life."

ACCIDENTS.

Explosion at the Staines Linoleum Factory.—It is necessary to granulate the cork used in the manufacture of linoleum, and it is ground in mills between stones till it becomes a fine powder. The grinding requires great care and attention, in order that gritty or foreign substances may not find their way among the powdered cork while the operation is being performed, as they are liable to cause an explosion. Two men were tending a grinding-mill, when the powdered cork suddenly exploded, the blast burning them seriously; the cloth around the mouth, worn to prevent the inhalation of dust, catching fire.

A Railway Station destroyed by Lightning.—The station buildings at Morthoe, on the new railway to Ilfracombe, have been struck by lightning and set on fire. There was a dense fog at the time. Owing to this circumstance, the fire was not discovered until it reached a store of fog-signals, which exploded and awoke the station-master and his family, who were sleeping in the adjoining dwelling. The booking office, telegraphic office, porters' room, parcel-room, and waiting-room were destroyed, with all the papers and apparatus they contained.

Fall of a Platform.—A fatal accident has occurred at the *fête* of Aubervilliers, in the environs of Paris. During the afternoon a heavy shower of rain fell, and a crowd of people took refuge from it on a covered platform erected for a band of musicians. The structure was not built to bear such a weight, and presently fell in with a crash, casting about 400 persons pell-mell together, amidst the wreck of planks, posts, and rafters. A large number of persons received contusions more or less severe.

RAILWAY MATTERS.

Central Station, Manchester.—The negotiations between the Cheshire Lines Committee and the proprietors of the Free Trade Hall for the purchase of that building with a view to the erection on its site of a great central station have collapsed, as the railway company find, it seems, that the site which has already been cleared behind the hall will be sufficient to meet all their requirements. The work upon the line between Windmill-street and Cornbrook is making satisfactory progress, considering the difficult operations which are involved in the demolition and removal of a great quantity of house and factory property. When the great viaduct which will carry the line to Windmill-street shall be completed, a temporary building, it is believed, will be erected pending the completion of the central station.

Subsidence on the Great Northern Line.—This line, which has for many years past been gradually sinking in places between Laisterdyke and Morley, still continues, as the *Yorkshire Post* states, to gradually subside. Consequently, the rails are raised and "packed" from time to time in order to retain a proper level, and at the stations, Laisterdyke, Dudley Hill, Birkenshaw and Tong, Drighlington and Adwalton, Gildersome, and Morley, more particularly, the height of the platforms is from time to time reduced in this way. At Dudley Hill, where only recently the platform was rebuilt, it is again getting lower, especially opposite the station-house, which is in a bad way from the same cause, and is even said to be unsafe to live in. Large cracks appear in the building at times, and these have to be wedged and stopped up as they occur. Passing trains shake off lime and plaster, and altogether the station is in a rather dilapidated condition. At the Birkenshaw and Tong station the platform still remains low, and is a cause of frequent complaint by travellers, as it is necessarily very inconvenient to get on and off the trains. Here also the station-house is cracked and patched up, and the station-wall on the opposite side is much shaken, irregular, and unstable. At Drighlington and Gildersome the platforms are to some extent low from this cause, and in Morley the platform has just been raised.

Railway Collapse in America.—A remarkable table is published in a recent number of the *New York Bulletin*. It is a catalogue of the American railway companies which within a very brief period have been compelled to admit their inability to pay the interest on their bonds. The companies number 74 in all, and the amount of bonds for which they are in default amounts to 335,295,668 dols., or not far from 65,000,000*l*. This is about 18 per cent. of the entire bonded debt of the railways of the United States.

IRRIGATION WORKS, INDIA.

SIR,—You were good enough, a year or two since, to insert a communication from me on this subject, in reference to some complaint which had previously appeared in your journal. I have pleasure in now calling your attention to the accompanying notice, which fully justifies and illustrates the remarks made by me on behalf of one who could not speak for himself, he having been then (as he is now) actively engaged under Government in the useful and important work above indicated, for helping forward the civilisation and prosperity of our Eastern empire.

The *Ceylon Observer*, of June 18th last, contains the following:—

"The Ellawella Tank is approaching completion, and Mr. A. B. Cruse, the officer in charge of it, will soon take up the work of the Denegama Tank, to the repairs of which a sum of 2,500*l*. has been wisely sanctioned by Government. Considering the ability of Mr. Cruse in the construction of the Haliella and Ellawella Tanks, we have no doubt whatever that the Denegama Tank, too, will, before long, be reckoned among the best water reservoirs of this district. The respect in which Mr. Cruse is held by the Tamil Coolies who have been employed under him is a sufficient guarantee that in the construction of the broken bund of the Denegama Tank, want of labourers will not be any source of trouble or annoyance."

From other information supplied to me, I may here add that each of the tanks at Haliella and Ellawella was constructed at an outlay of about 6,000*l*., and contains a surface 240 acres in extent, supplying water to irrigate 8,000 acres of land. Tamil coolies, to the number of 250, were imported into Ceylon by Mr. A. B. Cruse on his own responsibility, he having become acquainted with their superior fitness and faithfulness, as compared with Singalese natives, while conducting similar works in the Madras presidency.

An entertaining account is given in the *Ceylon Observer* of August 18th, 1873, of the Governor's tour through the Southern Province, including his boating excursion on Lake Haliella, among scenery which excited his Excellency's rapturous admiration.

T. CRUSE.

BY BOAT TO HAMPTON COURT.

SIR,—Seeing that one of the Thames steamboat companies (I neither know nor care which—they may put the saddle on the right horse for themselves) advertised boats to Hampton Court on Sunday and Monday, and, never having been that way, I tried the experiment on Monday, and may warn any one similarly inclined against doing so.

The statement that the boats are specially suited for the shallow part of the river (see the placards) is false; for they are only the well-known "Citizen" boats, built for the ordinary Thames traffic. Leaving London Bridge in one of these at ten, we found ourselves, after a gradual slackening of speed for some time, aground at half-past twelve below Kew Bridge, where we remained till three. The tide having then crept up enough to lift the boat, we proceeded at quarter-speed, and by a process which seemed to consist chiefly in sliding and scraping along the bottom, varied by entire stoppages every now and then at the shallowest parts. On getting to Richmond and finding it was a quarter-past four, I thought enough had been done for glory, and walked down the banks again to Kew Bridge railway station, "and so home," as Pepys hath it.

The crew of the boat seemed to think it a matter of course, indeed a good joke, inviting us to "get out and walk," &c.; and as I had a book, and the day was fine, I was able to take the same view of the matter. But I doubt whether all the hundred or more passengers, many of them respectable people of the humbler

class, who had come out with families of small children, for perhaps a rather rare holiday, quite appreciated the joke; and as the captain and crew probably knew what was likely to happen, I think the whole thing rather like obtaining money on false pretences. I should observe, that the officials had the prudence and foresight to collect the fares *before* arriving at the "sticking-place."

By building two or three *small* steamboats on a special model, and dividing the passengers among them, it would be possible to make the river journey to Hampton Court a most pleasant excursion; but as it is managed now, people who are rash enough to go that way will find themselves, like your present correspondent,

TAKEN IN.

MESSRS. GOSTLING'S SHAFT, NORTHFLEET.

THE 220 ft. chimney-shaft at Messrs. Gostling's cement works, Northfleet, has just been rebuilt according (as we are told) to the original design. The special precautions which the accident of last year had shown to be indispensable, were taken to ensure that all the bricks should be wetted before being laid, and that none of the mortar or cement should be worked up again after being spoilt or "killed." The architect was Mr. Cubitt; the contractor for the labour was Mr. Blagburn; and Messrs. Gostling, as before, supplied their own materials.

LANDING STAGES.

READING the account of the Liverpool floating stage being burnt a short time ago, the thought struck me how easy it would be to contrive a series of sluices or cocks, so as to submerge the stage below the water in case of another casualty of the same description. It would then only be a question of pumping out the pontoons to raise the stage again,—a much less formidable job than rebuilding, as at present.

W. BAMFORD.

HOSPITAL SATURDAY FUND.

SIR,—Hospital Saturday is now so far a *fait accompli* that I trust you will pardon my addressing you to endeavour to persuade you not to withhold any longer your support to so great, good, and noble a cause. As one of the executive committee, and as one of the profession which the *Builder* represents, I have frequently been "twitted" with the fact of your being against the movement, and of the great harm which has resulted therefrom. I believe the chief reason which caused you to condemn the movement was that it tended to encourage the working classes to absent themselves from places of worship. That this is not so I could easily show, but I should be taking up too much of your valuable space: sufficient be it for me to state that it has been proved by those fully competent to judge that six-sevenths of the working classes do not go to church on a Sunday. Why this is so, and how to make them attend, are questions I shall leave others to determine. So far as I am concerned, I am content to know that such is the fact. That very large sums of money can be obtained readily and willingly from the working classes, if properly applied to, in aid of the hospitals and dispensaries, of the benefits of which they are the principal recipients, is also an acknowledged fact. During the last few months our committee have had considerable difficulty in overcoming prejudices in various quarters, but in none are we so anxious to be regarded as doing the proper thing as with you. Will you therefore, I ask, in the name of the committee, and in the name of common philanthropy, help us in our good work by stating that we wish to be represented in all the large building firms, manufactories, &c.; that local committees are yet required in many districts; and that all who may apply at 45, Leicester-square, may receive collecting-boxes, books, cards, and sheets, for the purpose of getting weekly subscriptions from the men between this and the day of general collection,—viz., the 17th of October next.

FRANK E. THICKE.

SCHOOL-BOARD SCHOOLS.

London.—A new school, which has been erected by the School Board for London in Bell-street, Edgware-road, has been declared formally opened. The school is situate in the midst of a dense population, and is one of three sanctioned by the School Board, all of which are on sites on which ragged schools formerly existed, and are within 500 yards of each other. It is for boys and girls, for 816 of whom accommodation is provided. Lord Napier and Ettrick stated that the entire cost of the school was a little over 16,000*l.*, which was more than 20*l.* a head for each child, but of this large sum 10,000*l.* were paid for the site, taken under the compulsory powers of the Board, and the cost of the building itself was only 6,726*l.* This was a larger cost than that generally incurred in the erection of voluntary schools, but the schools of the Board were built on a different and better system, and had appliances and playgrounds attached, which very few of the voluntary schools had. The statistics showed that school accommodation was required in the metropolis for 119,000 children. Up to the present time the School Board had actually constructed 59 schools, and tenders had been accepted for 50 more. When these were completed, accommodation would be provided for 87,000 children, leaving 32,000 still unprovided for.——Another Board school has been opened by Mr. E. H. Currie, vice-chairman of the Board. It is situated in the Wandsworth-road, cost 1,700*l.*, and will accommodate 1,087 children. Nine permanent schools have now been opened in the Lambeth district, accommodating 7,848 children.—In Aldenham-street, St. Pancras, a new Board School has also been formally opened, when a public meeting was held in the building, which was numerously attended. The school will accommodate 341 boys, 327 girls, and 348 infants, being 1,106 in all. The site cost 8,799*l.* 8s. 2d., and the building 7,168*l.* 10s. 10d. This makes the sixty-first school that the Board has opened. The schools are roomy, light, and well ventilated, and thoroughly adapted to the requirements for which they are intended.——A new building has been erected by the London School Board for the parish of Chiswick, close upon the railway which runs through the district. It is a large and commodious structure, and has ample playgrounds. It will be ready for occupation in the course of a few weeks.

Leicester.—The new schools, erected by the Leicester School Board, to accommodate 943 children, at the corner of Slater-street, Frog Island, have been publicly opened by the Mayor, Mr. W. Kempson, in the presence of a considerable number of the working classes in the neighbourhood. The school is divided into four departments, the infants' and mixed departments being down-stairs, and the boys' and girls' departments upstairs. All the rooms are lofty and well ventilated, and are each supplied with two class-rooms. There will be accommodation in the infants' school for 243 children, in the mixed school for 227, in the girls' school for 227, and in the boys' school for 247. The schools stand on an area comprising 968 square yards. The architect has done the best he could with the small area at his disposal. The cost of the land was 1,330*l.* There were a lot of buildings on the site which had to be taken down. The schools are in the midst of a dense population. The total cost of the building will be in round numbers about 6,000*l.*, so that the cost of the schools will be 7,350*l.*, or an average of 7*l.* 15s. per child to be educated.

Shavington.—This Board has appointed Mr. T. Bower, of Nantwich, as their architect. Mr. Bower is also the architect to the Willaston Board. A new school for 140 children is wanted at Shavington.

CHURCH-BUILDING NEWS.

Reading.—St. John's Church tower and spire have been completed. The tower and spire have been erected at a cost of 2,500*l.*, from designs by the architect, Mr. W. Allen Dixon, of Kentish-town. The contractors were Messrs. Niblett & Son, of Hornsey-rise, and the clerk of the works Mr. E. Green. The height of the tower and spire is 152 ft., the tower being 66 ft. high. The tower, like the church, is built of Kentish rag; and the spire, which is octagonal, is of Bath stone and Mansfield columns. The spirelet windows are of Bath stone, perforated with quatrefoil, and the terminations of the buttresses are canopied and sloped with Mansfield shafts, and carved capitals, bosses, and finials. The openings of the belfry are filled with galvanised corrugated iron louvres, and the arcading below is of Mansfield and Bath stone. The style of the whole is French Gothic, of the sixteenth century. There is a cornice round the base of the spire, and the summit is crowned with a finial, above which is the vane, which also answers the purpose of a lightning conductor. There are two circles of Mansfield and Bath stone alternately, in the tower, for the dials of a clock, and space in the belfry for eight bells. The principal entrance to the church is by a doorway in the tower. Above the doors is the eagle of St. John, in the centre spandrel, and the arch is double-recessed with Mansfield columns, and crocketed and gabled, the whole terminating with a finial. The exterior of the church is now complete.

Sittingbourne.—The new church of All Saints' Murston, has been consecrated by the Archbishop of Canterbury. The site was given by Mr. Smeed, who also gave 250 loads of flints and three barge-loads of building-sand towards the material required for building. The church is built of cut flint in straight courses, with Bath stone dressings. It comprises a chancel with circular apse, nave, with aisle and tower; it is in the Early English style of architecture. The tower is not finished, but it will eventually be surmounted by a spire, bringing the total height to 135 ft. The organ-loft is on the north side of the church, and behind it is the vestry, which is enclosed by the ancient rood-screen from the old church, which from its age is of archæological interest. The seats are open benches for about 400 persons. The church is lighted by gas standards. It will be warmed by Parritt's patent stove or hot-air apparatus. The nave and north aisle are paved with Staffordshire tiles, and the chancel and sacrarium with Godwin's tiles. The work has been carried out by Messrs. Adcock & Rees, of Dover; the architect being Mr. Burges, of London. A new organ has been built for the church by Messrs. Lewis & Co., of Brixton.

Tunbridge Wells.—The foundation-stone of the proposed new church in Windmill Fields, Tunbridge Wells, intended as a thank-offering for the recovery of the Rev. Canon Hoare from recent serious illness, has been laid. The circumstances which have rendered the erection of the church necessary, says the *Kent Courier*, are as follows:—Windmill Fields is a suburb of Tunbridge Wells which of late years has gone on increasing in size until it has now a large population. Some fifteen years ago the Rev. Canon Hoare and the congregation of Trinity Church erected a school-room in the locality, in which service was held every Sunday evening; but this room became too small, and four or five years ago a larger room was added, and this room is not adequate for the accommodation of the congregation. The site of the proposed new church is on the St. Mary's Hill estate, at a point opposite the road leading to Hall's Hole. The building, which is to be constructed of native stone, with tiled roof and traceried windows, with Bath-stone dressings, is after the Decorative style of architecture, and the plans have been prepared by Mr. H. H. Cronk, architect, Tunbridge Wells. The extreme length of the new church will be 92 ft., the dimensions of the nave being 72 ft. by 32 ft., and the chancel 25 ft. by 17 ft., and, when finished, it is expected that it will seat about 450 persons. The design is such that aisles may be added on either side when they become necessary. Messrs. Willicombe & Oakley, builders, Tunbridge Wells, are the contractors.

Whitegate.—The church of Whitegate, Vale Royal, is being restored. The old church externally was a plain brick building, with a narrow square projection at the west end rising considerably above the level of the roof which did duty for a tower. Internally, the church was divided into nave and side aisles by means of wooden pillars, which, with the roof timbers, remain in the new building. In the rebuilding, externally, new mullioned and traceried windows of stone will be inserted in the side walls of the body of the church; the old parapet walls will be removed, and projecting eaves, with a cove formed of cement underneath, provided instead. The roofs will be covered with brown tiles. In the new work it is intended to re-use as much as possible of the old walling, which is of bricks of a small size. On the south side there will be a new porch, of oak. The entrance from this into the church will be the old doorway, which will thus remain as a relic of the old work. Adjoining this, at the west end, is the vestry, which is new. The tower it is intended to pull down to about 3 ft. above the ridge of the main roof. This will be surmounted by a spire, constructed of wood and covered with oak shingles, terminated by a gilt weathercock. New windows will be inserted above the belfry floor, and at the west end an arched two-light traceried window will be put in. The chancel, which will be considerably longer than the old one, will be new. At the east end is a five-light window, and two lights of similar design are placed at the sides. Open benches will be substituted for the old pews; these will be stained and varnished. The whole of the chancel fittings, as well as the new chancel arch, will be of oak. The windows will be glazed with cathedral tinted glass, and the heating will be by means of hot-air apparatus. The design of the new work is of a Late Gothic character; and the whole is being carried out by Mr. Richard Beckett, of Hartford, from the plans and under the superintendence of Mr. John Douglas, architect, Chester. The estimated cost of the work is 1,600*l.*

DISSENTING CHURCH-BUILDING NEWS.

South Cave (*Hull*).—A new Independent Chapel has been opened in this village. It has been erected on the site of the old one, which was the oldest in the East Riding of Yorkshire, and was quite unsuitable for the present congregation. It is in the Romanesque style of architecture, and is built with red bricks and dressings of Ancaster stone, black bricks being used in the arches and string-courses. The entrance doorway is the principal front, and is the main feature of the building, having moulded caps, carved tympanum, and moulded stone label, terminating with a scroll under the gabled coping. The vestibule is lighted by windows on either side of the door, having moulded and sunk stone heads. The large centre window, lighting the gallery, is divided by a moulded shaft with carved cap and moulded base. The building is lighted on either side with eight semicircular-headed windows, with moulded transoms, the upper portion being made to open for ventilation. The accommodation provided is for 250 persons, in open benches, having framed and chamfered ends. The roof is open-timbered, the principals being chamfered and perforated, and resting on moulded stone corbels. The whole of the woodwork is slightly stained and varnished. The works have been carried out from the design, and under the superintendence, of Mr. Samuel Musgrave, architect, Hull; the contractors being Mr. Goodwill, builder; Mr. C. Brown, joiner; Mr. Cousens, plumber and glazier, all of South Cave; and Messrs. Thomas Smith & Co., slaters, of Hull. The heating apparatus was supplied by Messrs. Longbottom, of Leeds.

Dorchester.—The Wesleyans of Dorchester have commenced the erection of a chapel, which is to occupy a prominent site opposite the Post-office in South-street. The cost of the new structure will be about 3,000*l*.; Messrs. Davis & Son, builders, Dorchester, have taken the contract; and Mr. Allardyce, architect, has prepared the plans.

Halton (*Runcorn*).—The foundation-stone of a new Wesleyan Chapel has been laid at Halton, in the Runcorn circuit. The site of the building is on Halton-hill. The premises will consist of a chapel, a meeting-house, vestry, and school-room; the dimensions of the former being 56 ft. by 36 ft., exclusive of chancel, and will accommodate 300 persons. At the end opposite to the entrance there will be a chancel with moulded arch, and carried on polished marble shaft, carved capitals, brackets, &c., and a traceried window, filled in with deep-coloured stained glass. The walls and ceiling of the chancel will be decorated. The organ-pipes, which will be seen from a side chamber both into the chancel and chapel, will be illuminated. The roof will be of high pitch, but a ceiling will be fixed about two-thirds up, having four sides, and formed into four bays by moulded principals, with carved ribs. The school-room behind the chapel will seat about 150 persons. The style of architecture is to be Early English. The main features of the front to the high road being a gable, having two three-light windows, separated by a central buttress, which supports, in conjunction with polished granite shafts, carved caps, &c., a stone belfry or turret on the top. The entire cost of the building will be about 3,000*l*. The work is being carried out by Mr. Holland, contractor, Chester. The architect is Mr. C. E. O. Ellison, of Liverpool.

Hornsea (*Yorkshire*).—The little church erected at the corner of New-road, Hornsea, by the Congregationalists, has been formally opened for Divine service. The church is built in an early style of Gothic architecture, and consists of nave and shallow transepts, tower, and spire. The tower and spire are at the south-west angle of the church, at the junction of Cliff-lane and New-road, and being on an elevated site, and rising to the height of 100 ft., it is a striking object for some distance around. The principal entrance is in the west front, through a porch, enclosed by wrought-iron gates leading into a vestibule lighted by three single-light windows, and paved with tiles in geometrical patterns; access may also be gained to the vestibule through the tower, in which is placed a stone staircase ascending to the gallery. The nave is lighted on each side by two two-light windows and a central window of three-lights, all having traceried heads. The transepts are 23 ft. wide and 7 ft. deep, opening into the nave by two arches; each transept being lighted by two two-light windows and a large geometrical traceried rose-window. All the windows throughout the church are glazed with cathedral glass in geometrical patterns. Accommodation is provided for about 500 persons, the seats being open benches. The gallery front is panelled. The roof is in one span and open timbered; and sufficient ventilation is secured by perforated ventilators in the ceiling. The whole of the woodwork throughout is stained and varnished. The exterior of the building is faced with white stock bricks, and the arches are executed in red bricks. The gas-lighting is effected by means of coronas suspended from the roof, and by brackets from the nave walls, all in wrought ironwork of Mediæval pattern. Attached to the east end of the church, and opening into it, is the school-room, 24 ft. by 18 ft., and contiguous to this is the minister's vestry, under which is a vault for the heating apparatus. The building has been erected by the following tradesmen, viz.:—Messrs. Hulse & Stephenson, bricklayers and plasterers; H. & W. K. Barr, joiners; James Barr, plumber, glazier, and painter; John Denton, mason, all of Hornsea; the ironwork was supplied by Messrs. King & Co., of Hull; and the slating executed by Messrs. Dawber, of Hull. Messrs. Thompson & Stather, of Hull, supplied the heating apparatus. The whole of the works have been carried out from the designs and under the personal superintendence of Mr. Samuel Musgrave, architect, Hull.

Books Received.

The Post-office Directory of the Building Trades. London: Kelly & Co. 1874.

The new edition of this volume professes to give the name and address of every person in every trade and profession in any way connected with architecture and the building trades throughout England, Scotland, and Wales; and we may suppose, from its bulk and appearance, that it fairly does what it professes. Our readers do not require to be told of the magnitude and importance of the interests thus dealt with, and it cannot be doubted that by numerous classes this directory will be found exceedingly useful, "bringing before them collectively and prominently thousands of persons scattered over various districts of Great Britain, who could not otherwise be addressed."

Miscellanea.

Excursion of Archæological Section of Midland Institute.—Eighteen members of the section and nine ladies took part in an excursion to the Wye district. The road taken was that crossing the river by Welton Castle. Leaving this for a more careful examination at some future time, the members made their way to Goodrich Castle. From Goodrich they went on to Monmouth, where they stayed to examine the Gate House on the Welsh Bridge. The post-office officials had neglected to forward the Secretary's letter ordering luncheon, and a somewhat hungry party were disappointed for a time in getting refreshment. An excellent luncheon was, however, served by the proprietor of the Beaufort Arms, in the garden, in a very short time. A careful examination of Tintern Abbey was made. The *cicerone* for the day gave a summarised account of its history, and afterwards conducted the members over the Abbey. An interesting discussion was raised as to the puzzling tablet which has recently been described as a map in stone of the Abbey estate, but the general opinion of those present was that this suggested origin of the stone was of much too speculative a character to be accepted. The suggestion which seemed to find most favour, was that the stone was one on which an outline of branches had been traced, which was intended to be filled in with foliage, and afterwards abandoned in an incomplete state. After luncheon, it was decided to prolong the excursion for a third day, and the party again broke up, some to walk over the Wyndcliff, others to visit the famous castle of Chepstow, before returning to Birmingham.

Survey of Brasil Coast.—Sir John Hawkshaw, C.E., has embarked for Brasil for the purpose of surveying a line of coast extending about 5,000 miles, beginning at Pernambuco, with the view of reporting upon eligible spots for the establishment of harbours, and for the construction of new railways.

Prizes for Hand Turning.—The Company of Turners of London, in continuation of their action in former years, propose to give, in 1874, their silver medal and the freedom of the company and of the City of London to any one workman or apprentice in England who may send in the best specimens of hand-turning for the year. Last year the prizes were awarded for turning in ivory and stone; this year one of the materials to be used will be brass or gun-metal. The chief medal and freedom will be adjudged to that object which the judges may decide to possess paramount merit as a specimen of pure turning, and the qualities which will be chiefly considered in awarding the prizes in metal are shown under the following heads:—(1) Truth and nicety of fitting. (2) Beauty of original design. In vases, tazzas, and similar examples special regard should be given to beauty of form, by causing the lines to run freely into each other, so that where they meet there shall be no abruptness. (3) Accuracy of copying. The specimens may be copies of any known work, and may be either of the same size or reduced. (4) Originality, novelty, or special skill in any other particular, as applied to this class of work. The specimens must be of moderate size; and it is recommended they should not exceed 3 ft. in any dimension. The judges of this year in metal will be the following:—Mr. S. Jackson, 66, Red Lion-street, E.C.; Mr. J. H. Evans, 104, Wardour-street, Soho; Mr. H. Porter, of Cary's, 181, Strand.

Improvements at Salford Cattle Market. Alterations are about to be made in the internal arrangements of the Salford Cattle Market. Increased accommodation will be afforded for the show of cattle by the extension of the market on the north side, and by the re-construction, for the reception of cattle, of a number of sheep-pens near the slaughtering-houses; and the whole of the banking business, which is at present transacted in wooden huts erected in different parts of the yard, will be done in a brick building, which will be placed near the centre of the market. The work of re-constructing the sheep-pens near the slaughtering-houses for the reception of cattle was commenced about six weeks ago. By this alteration the pens in which the Irish dealers show their cattle and sheep will extend from one end of the market to the other. A gateway will be specially erected in Cross-lane, in the style of the four existing entrances. Mr. Thomas Lowe, of the Crescent, Salford, is the contractor for the alterations, which will cost about 2,000*l*., and the plans have been prepared by the borough engineer, Mr. A. M. Fowler. Mr. Fowler's design for the bank building is 46 ft. square, and it will be constructed of brick, with stone dressings. It will be one story high, and will be divided into seven different banking departments, each of which will be complete in itself. In connexion with the new building, a telegraph office, much larger than the present one in Cross-lane, will be erected. It is estimated that the cost of the new buildings will be about 1,400*l*.

Death of Mr. Cosmo Innes.—The Professor of History in the Edinburgh University, and one of the Principal Clerks of Session, has expired suddenly at Killin while on an excursion and in his usual health. In a letter dated Monday, he said, "We shall be home on Friday or Saturday, I hope;" but on Friday he was no more, and on Saturday his remains were conveyed to Edinburgh. On Thursday, Mr. Innes was suddenly taken ill, with apoplectic symptoms. He lingered till Friday evening, when he expired. This well-known and esteemed gentleman was born on the 9th of September, 1798, at the old manor-house of Durris, on Deeside. He was admitted to the bar in 1822, and in 1846 he was elected to the Chair of History in Edinburgh University. The various courses of lectures given by him to a small but select band of students were graced by beauties of style that materially helped his efforts to interest his class in their subject matter. His personal friends and correspondents included Montalembert, Guizot, Thiers, and other Continental notabilities, literary and political. He delighted in devoting his talents and energies almost exclusively to the illustration of the past of his native country. Mr. Innes's eldest son is Chancellor of the Exchequer in Borneo, and the younger an engineer in India.

Board Schools, Biggleswade.—The plans selected for these schools are by Mr. Thomas Elworthy, of St. Leonards-on-Sea.

Bursting of Henbury Reservoirs.—This was the most important case heard at the Cheshire Summer Assizes, and was an action brought by the surveyor of the county of Chester, Mr. Charles Nichols, to recover damages caused by the destruction of four of the county bridges in consequence of the bursting of some artificial lakes on the defendant's estate at Henbury, near Macclesfield, on the 18th of June, 1872. The jury, before any evidence was adduced for the defendant, intimated that they were satisfied that what took place was an accident, or *vis major*, and that there was no negligence in the construction of the works. The Judge said that there was still the further question whether there was such a downfall of rain as would amount to a *vis major*. He would enter a verdict for the plaintiff for the amount, with leave for the defendant to move to set it aside, if the court should be of opinion that there was such a downfall as to amount to a *vis major*. In his opinion it did not. The jury added they did not think what occurred could have been guarded against; but his lordship said that was different from saying that there was neglect, and the Clerk of the Records then formally entered the verdict for the plaintiff.

Clayton West.—The outbreak of typhoid fever in the village of Clayton West, near Huddersfield, to which attention was recently drawn, has been the subject of an official inquiry by Dr. Thorne, one of the Medical Inspectors of the Local Government Board, and early last week Dr. Thorne communicated the results of his inspection to a meeting called together by the Local Board of Health. The epidemic appears to have been of considerable severity, since it has already caused eleven deaths, which, at the usual rate of mortality, would represent sixty-six cases. The spreading of the fever was locally believed to have been due to the use of polluted water, but it has now been traced to the inhalation of specifically poisoned emanations from a drain into which the slop-water from a laundry, where the first patient's linen was washed, had been cast. The means by which the polluted air was conveyed into the dwellings of the sufferers was through sink-pipes, which were connected with the drain in such a manner as to place the interior of the cottages in direct communication with the poisoned drain.

Berkshire Archæological and Architectural Society. — This society has made its second excursion of the season, this year Windsor being selected, previous permission having been obtained from the Lord Chamberlain and the Dean of Windsor to view the Castle, including many parts of archæological and architectural interest not usually shown to visitors. The party numbered between forty and fifty, and left Reading per Great Western Railway shortly before one o'clock. On arriving at Windsor they proceeded at once to the Castle. Here the excursionists were met by Mr. Seabrook (chief clerk to the Lord Chamberlain), and Mr. Howe (clerk of the works), who conducted them to the principal entrance-hall of the Castle. There Mr. Albury, the vice-president, read a paper, in which he pointed out the most interesting parts of the Castle, and gave a short history to within a hundred years of the present time. After visiting various parts of the buildings, the party returned to Reading about nine a.m.

The New Act on Dwellings for Working Men.—An Act of Parliament received the Royal assent on the day of the prorogation, the object for which, as we have before said, is to facilitate the erection of dwellings for working men on land belonging to municipal corporations in England. It provides that where a corporation determines that land belonging to them shall be converted into sites for working men's dwellings, on obtaining the approval of the Treasury to the corporation making for that purpose grants for leases of 999 years or for less terms then the provisions mentioned in the Act are to apply. The costs and expenses are to be paid out of the borough rates. The forms in the schedule as to grants and leases show how concise legal documents can be made. The Act is now in operation.

Manufacture of Portland Cement. — A public open-air meeting is to be held in the Rectory Grounds, Swanscombe, on (this) Saturday, Aug. 22, to test, as far as possible, the grounds on which legal proceedings are being taken against the manufacture of cement in this district. The question is serious.

All Hallows, Bromley.—The consecration of the new church of All Hallows, Bromley, Middlesex (about fifteen minutes' walk from Bow Station, North London Line), has taken place. The building, which is intended to seat 800 persons, has been erected by Mr. William Brass, from designs by Mr. Ewan Christian, at a cost of about 7,500*l.*, portion of a special fund held by the Ecclesiastical Commissioners for that purpose. The building of the rector's house and large room adjoining the church, available for Sunday schools and kindred purposes, has been given by the Grocers' Company to the same hands. Cost of the house, 2,500*l.*; of the parish room, 1,000*l.* Mr. John Griffiths was clerk of the works, and Mr. Seagood the general foreman.

Street Watering with Sea-water at South Shields.—The borough surveyor has reported to the Improvement Committee of the borough of South Shields on the probable cost of street watering with sea-water. He suggests the highest part of Westoe as the site of the reservoir, and gives the cost of arrangement for watering the chief thoroughfares at 7,800*l.*, and the weekly cost at 4*l.* The flushing of a part of the sewers as well as the watering of the streets is included in the estimate. He admits the great superiority salt water possesses in a sanitary point of view, but contrasts unfavourably the cost by comparison with that of fresh water, which he states is only 20*l.* per annum for street watering, and 75*l.* for all purposes, including flushing sewers, watering streets, and supplying fountains and urinals.

The Practical Art Exhibition at Paris.—The Exhibition of Practical Art in the Champs Elysées promises well. This exhibition has been got up by "L'Union Centrale des Beaux Arts Appliqués à l'Industrie," and approximates nearer to South Kensington than any preceding one held in the same place. It is divided into three sections. The first group comprises modern works of art, intended for industrial reproduction and practical applications already made. Ceilings, mural decorations, curtains, and other articles of first-class upholstery, articles of virtu, including bronzes and ceramics, belong to this section. The second group chiefly consists in the drawings and models of pupils of the schools of design of Paris and the provincial towns. The third section is entirely retrospective.

Pneumatic Drainage.—Dr. Joyce, of Cranbrook, has read a paper on this subject, before the members of the Tunbridge Wells Farmers' Club. The chair was occupied by Mr. B. Wickham, president of the club. Dr. Joyce described the pneumatic or suction system of Captain Liernur, of which we have already spoken. After a discussion, Dr. Joyce, in reply to questions, said the system was a threefold one; it could be mixed with earth, it could be sold in barrels, in solution, or as a powder. There was now a company being formed by Mr. Adam Scott, of London, and as soon as they were formed they proposed to arrange for towns. He should suppose that a place like London would be split up into districts. There the main drainage scheme was a failure, and irrigation could not be universally adopted.

Almshouses, Westerham. — One of the members of the Sisterhood of Mercy, established at Clewer, near Windsor, in connexion with the Church of England, inherited some time ago a considerable fortune. A rule of the society to which Miss Moreton, the sister in question, belongs, lays it down that all property coming into the possession of any member shall be expended in some religious or charitable scheme. Accordingly Miss Moreton decided to devote her wealth to the building of a set of almshouses and the perpetual maintenance of the occupants. A cottage hospital was also to be founded. The completion of this charitable project has just been brought about. The site chosen for the almshouses and hospital was at Westerham, the village where the donor resided prior to her assumption of the veil.

Working Men at St. Paul's.—On Saturday, last week, about seventy men visited St. Paul's Cathedral, and were received by the Rev. Canon Liddon, who kindly accompanied them over the building, and described its many objects of beauty and interest. The nave, transepts, choir, crypt, galleries, library, clock-tower, and even the remote ball were visited in turn, and in the trophy-room refreshments were provided for the party.

Wire Netting.—An American paper states that wire netting for plastering is being rapidly introduced to take the place of laths. It takes less labour to put on the walls; is more continuous, and will not burn. Coarse netting with 1-in. mesh, and made of strong wire, is found to answer best. For ornamental cornice work it is especially valuable, for it can be bent in any desired form. Secured to iron studding in a brick building our greatest danger on account of fire would be removed. A still further application on this plan is to make round bags of wire resembling barrels, and to coat them inside and out with cement. When it hardens they resemble barrels. Filled with sand and sunk in rows and masses, they make excellent building materials for breakwaters.

New Survey and Valuation of Rugeley. A public meeting was held in the town-hall to consider the tenders given for a new survey and valuation list for the parish. The attendance was very limited. It was intimated that several tenders had been received, some for altering and correcting the old map and re-valuation for 250*l.*, and others for an entire new map, the size of the Government survey of 25 in. to the mile, and re-valuation for 400*l.* and 500*l.* After some conversation, it was resolved to adjourn the meeting to ascertain from the Union whether the Government Ordnance Survey Map, with the alterations of recent date and a re-valuation, would meet the requirements of the Act of Parliament. The custom of walking the boundary is to be observed.

Uncultivated Lands.—It is estimated by the Enclosure Commissioners that there are in England and Wales nearly 900,000 acres of commons which, judging from their moderate altitude and the character of the adjacent lands as shown upon the tithe maps, may be regarded as apparently suitable for ordinary cultivation. Much of this land has probably been left out of cultivation on account of some drawback,—its inferior quality, its remoteness from the population, or its being more costly than the surrounding land to bring into a productive state. The Commissioners estimate that there are also in England and Wales nearly a million and a half acres of commons, apparently mountain land or otherwise unsuitable for cultivation.

Strike in the Building Trade at Pontefract. — Upwards of sixty bricklayers and labourers employed under the various master builders in Pontefract have left work, refusing to start unless the time for commencing work in future be at seven in the morning instead of six, as at present. The men held a meeting on a Friday evening, giving notice to the masters on the Saturday, thus allowing them no reasonable chance to procure other hands. The masters refuse to comply with the wish of the men, and the strike is therefore likely to continue, although the building trade in Pontefract was never better than at present, complete streets being in course of erection at the west end of the town.

Fall of a Building at Sheffield.—Messrs. Fenton, Brothers, silversmiths, Porter-street, having recently added to their premises a cottage and public-house adjoining, in adapting them to the purposes of their trade, a chimney-stack was erected near the centre, and upon it most of the flooring rafters and other works rested. The plan had been pursued of altering and occupying the upper part of the premises first, and then the contractor proceeded to dig out cellars around the base of the chimney. The recent rains had soaked into the foundations, and the stack gave way, and brought down the roof and floorings with it. The damage is roughly estimated at 500*l.*

The Delabole Slate Quarries.—The Cornwall Minerals Railway Company are about to extend their lines into the slate quarry district. The leading slate quarries of Cornwall are the Old and North Delabole. Both these properties have recently changed ownership, with the object of carrying on operations on more extended scales. About 100,000*l.*, or nearly, is said to have been the figure at which the Old Delabole quarry has changed hands. The North Delabole, which has been in operation about half a century, has been purchased by a limited liability company, who have commenced operations.

A New Temperance League Hall is about to be erected in Liverpool to accommodate 4,000 people. The architects are Messrs. T. E. Murray & G. H. Thomas.

Testimonial to Mr. John Gibson, Landscape Gardener.—It is proposed to present a testimonial to Mr. John Gibson, the originator of that style of garden embellishment which is called sub-tropical gardening, and for which Battersea Park, under his superintendence, became a familiar example. Mr. Gibson has for some months past been suffering from a severe attack of paralysis, and a principal object of this testimonial is to meet the manifold expenses which are incidental to a prolonged illness. A committee has been formed to give effect to the proposal, and Mr. H. J. Veitch is acting as hon. secretary.

Working Men's Institute, Henley.—The foundation-stone of the Working Men's Institute at Henley, has been laid by Mr. W. H. Smith, M.P. The building will consist of reading and coffee rooms, lecture-hall to seat 300 people, and accommodation for the hall-keeper. It is situated in a central part of the town, on a plot of land in Duke-street, and will cost 750*l.*, of which sum 500*l.* have already been subscribed. Amongst those present at the laying of the stone were the mayor (Mr. T. W. Jeston), Lord Camoys, Lieut.-Colonel Makins, M.P., and a large number of working men.

Opening of Smith Institute, Stirling.—The Smith Institute, Stirling,—which includes within its walls a larger and a smaller picture gallery and two museums,—has been opened by Sir William Stirling-Maxwell, bart., M.P. From noon the day was generally observed as a holiday in the burgh. The opening ceremony took place in the large picture gallery. Among the paintings on the walls is one of the founder of the Institute, Mr. T. S. Smith, by his friend Mr. A. W. Cox, Nottingham, one of the trustees. Mr. Lessels is the architect of the Institute.

The Ryde School of Art Building.—The foundation-stone of a new building for the Ryde School of Art has been laid by the Crown Princess of Germany, in the presence of the Crown Prince and a large assemblage of the resident and visiting gentry of the Isle of Wight. This building is being erected in George-street, Ryde, and is to consist of a number of class-rooms for study, with a public hall in the centre. For the occasion the street was decorated, and from the poles and planks of the building were flying the English and German standards.

St. Thomas's Hospital.—A statue of Her Majesty has been conveyed to St. Thomas's Hospital from the studio of Mr. Noble, who has been engaged upon it for a considerable time. Her Majesty is represented seated in a chair of state, with one foot resting upon an embroidered cushion. The statue, which is of white marble, will be placed temporarily just within the main entrance to the hospital, and is expected to be uncovered in the course of a few days.

The Church of St. James, Duke's-place.—Under a faculty from the Ecclesiastical Commissioners, and by virtue of the City Improvements Act, the demolition of the Church of St. James, Duke's-place, and the removal of the bodies, have been completed. The monuments, mural tablets, &c., have been removed to the Church of St. Catherine Cree, Leadenhall-street, to which church the parish of St. James is now affiliated.

Value of City Property.—Messrs. Hards, Vaughan, & Jenkinson, of Moorgate-street, have recently sold by private contract the freehold premises, 9 and 10, St. Mary-at-Hill, Eastcheap, and 27, Love-lane, in the rear and in connexion with the same, forming one block, and covering an area of about 3,600 square feet, for the sum of 15,250*l.*

The King's Palace at Kandy.—According to the *Athenæum*, Mr. W. H. Gregory has, since he has been Governor of Ceylon, restored the King's Palace at Kandy, which is one of the finest things in the East. Some of our readers in India will perhaps tell us who was the architect employed, and how the work has been done.

Novel Tramway Cars.—The propulsion of tram-cars by steam has been already realised in Chicago. A boiler on the car is supplied with steam from a stationary boiler, and the charge is sufficient for a run of three miles, a speed of twenty miles an hour being attainable.

Hastings New Town Hall.—Discussion is going on in the local press as to the possibility of architects giving all that is asked for, for the sum named, 10,000*l.* Who are to examine and decide as to the best design?

TENDERS

For pipe sewer, man-holes, and lamp-hole, Harlesh, Mr. Thomas Roberts, engineer:—

G. Williams	£120 0 0
Morris	115 0 0
Jones	115 0 0
Hughes	113 0 0
R. Williams (accepted)	84 0 0

For new warehouse, Snow-hill, for Mr. Bolton. Messrs. John Young & Son, architects. Quantities by Mr. A. L. Bussard:—

Hill Higgs, & Hill	£3,970 0 0
Hart	3,856 0 0
Ashby & Horner	3,843 0 0
Conder	3,796 0 0
Lawrence	3,750 0 0
Brass	3,670 0 0

For new infants' school, for the Llanverchva Upper School Board. Mr. E. A. Lansdowne, architect:—

Parfitt (accepted)	£648 0 0

For alteration to shop and premises, for Mr. H. Comley, Commercial-street, Newport, Monmouth. Mr. E. A. Lansdowne, architect. Quantities not supplied:—

Prosser	£536 0 0
J. Jones	525 0 0
G. Jones	521 0 0
Williams & Sons	509 0 0
J. Williams	507 0 0
Thomas	495 0 0
Miles	475 0 0
Wittaker	470 0 0
Linton (accepted)	462 0 0

For Beenham Court, Hants:—

Reading	£7,340 0 0
L. H. & R. Roberts	6,897 0 0
Groome & Co.	6,700 0 0
Crook	6,700 0 0
Wright, Brothers, & Goodchild	6,625 0 0
Elliott	6,428 13 0

For additions to the Latymer schools, Lower Edmonton Mr. E. Ellis, architect:—

Linnell & Sons	£448 0 0
Field & Sons	420 0 0
Ward	419 0 0
Hunt	398 0 0

For stables, Sutton-street, Belvedere-road, Lambeth for Messrs. Eastwood & Co., limited. Mr. George Judge jun., architect. Quantities supplied:—

Shepherd	£600 0 0
Hobson	596 0 0
Sharpington & Cole	545 0 0

For converting No. 12, Union-street, Borough, into two shops and dwelling-houses. Mr. J. R. Furniss, architect. Quantities supplied by Mr. H. Tovey:—

Hyde	£897 0 0
Croaker	879 0 0
Harrison	850 0 0
Castle	815 0 0
Lamble	629 0 0
Bush (accepted)	598 0 0

For the erection of three warehouses, Milton-street, E.C. Mr. Coutts Stone, architect:—

Brass	£15,083 0 0
Nightingale	14,731 0 0
Little	14,350 0 0
Mark	13,750 0 0
Downs & Sons	13,630 0 0
Lawrence	13,548 0 0
Sewell & Son	13,280 0 0
Bangs & Co.	13,145 0 0
Killby	13,137 0 0
Elkington	12,936 0 0
Crabb	12,906 0 0
Perry & Co.	12,353 0 0
Merritt & Ashby	12,131 0 0

For alterations and additions to No. 539, Kingsland-road, for Mr. Evans. Mr. Hart, architect:—

Steele	£869 0 0
Crabb	810 0 0
Hayworth	797 0 0

For the erection of engine and boiler-house and shaft, 130, Bunhill-row. Mr. H. J. Hammond, architect:—

Merritt & Ashby	£1,025 0 0
Kent	1,015 0 0
Moreland & Nixon	998 0 0
Adamson & Son	997 0 0
Crabb	950 0 0
Hunt	911 0 0

For works to stables and alterations of washhouse and cottage, Willesden-green:—

Groome (accepted)	£2,160 0 0

For the construction of new sewers in Thistle-grove and Thurloe-mews, Brompton, for the Vestry of St. Mary Abbott, Kensington. Mr. James Broadbridge, surveyor:—

	Thistle-grove.		Thurloe-mews.	
Harris	£1,694 0 0		£154	0 0
Crockett	1,570 0 0		142	0 0
Mears	1,448 0 0		145	0 0
Wigmore	1,400 0 0		150	0 0
George	1,279 0 0		140	0 0

Feltham, Brothers, gross, £1,947.

For alterations, additions, and repairs at No. 7, Grove-end-road, St. John's Wood, for Mr. Christopher B. Smith. Mr. Wm. Ward, architect:—

Spencer	£900 0 0
Henstead & Sons	795 0 0
Braid, Jopling, & Co.	776 0 0
Garrod & Smith	647 0 0
Higgs (accepted)	605 0 0

The Church of St. John's, Horsleydown.—Sir: As you were supplied for your issue of last week with an erroneous list of tenders for the above, I hope you will in justice insert this, as it could not possibly be an error, as you will see by there being one left out, viz.:—

Phillips	£584 0 0
Stephens	470 0 0
Brighton	465 0 0
Pitman & Cuthbertson	444 0 0 and
Mansfield	396 0 0

who sent an amended tender something below the lowest and was accepted; a fact which, together with the list supplied to you, speaks for itself to at least

One of the Contractors.

TO CORRESPONDENTS.

J. R. (we do not propose to print the remainder of the paper referred to).—Bristolian (we did not pretend to give an account of all the proceedings of the British Archæological Association in Bristol. Full reports will doubtless appear in the "Transactions" of the Society).—F. R. T.—F. C.—C. G. S.—R. A.—H. T.—A. R.—J. D. H.—G. C.—W. C.—H. P.—J. C.—C. J. L.—G. S.—W.—M. O.—W. H. L.—G. & Sons.—J. R.—G. H. M.—A. H.—F. C.—Mr. U.—S. R.—R. P.—T. K.—W. P.—J. B. D.—T. J. H.—J. C. G.—W. P. G.—C. C. H.—S. S.—Mr. M.—H. W.—T. R.—T. B. S.—R. A. L.—H. E. (shall be kept in mind).

We are compelled to decline pointing out books and giving addresses.

All statements of facts, lists of tenders, &c. must be accompanied by the name and address of the sender, not necessarily for publication.

Note.—The responsibility of signed articles, and papers read at public meetings, rests, of course, with the authors.

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